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**STANDING OPERATING PROCEDURE  
FOR  
EXPLOSIVE DESTRUCTION SYSTEM  
PHASE 1 UNITS 2 AND 3 OPERATIONS**

*Express*  
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UTAH DIVISION OF  
SOLID & HAZARDOUS WASTE



Requests for this document must be referred to EDS P1U2&3 System Manager, ATTN: SFAE-CD-NM, Bldg. E4405, 4585 Hoadley Road, Aberdeen Proving Ground-Edgewood Area, MD 21010-4005.

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**PRODUCT MANAGER,  
NON-STOCKPILE CHEMICAL MATERIEL**

**FINAL**

**May 2003**

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STANDING OPERATING PROCEDURE

Building #

Rooms #

HOOD #

☐ Amendment  
☒ Chemical Agent  
☐ Biological/Toxin  
☐ Radiation  
☐ Lasers  
☒ Industrial  
☐ Pyrotechnics  
☒ Other (specify: Explosives)

**CB SERVICES DIRECTORATE  
CHEMICAL APPLICATIONS DIVISION**

**ECBC**

**Title: STANDING OPERATING PROCEDURE FOR EXPLOSIVE DESTRUCTION  
SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS**

SOP #: CR4-0NP020

Submitted by:

\_\_\_\_\_  
Team Leader

Environmental Quality Office: \_\_\_\_\_

Risk Reduction Office: \_\_\_\_\_

Cdr, Technical Escort Unit: \_\_\_\_\_

Approved by:

\_\_\_\_\_  
Timothy A. Blades

APPROVAL DATE: \_\_\_\_\_

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**SOP TITLE: *EXPLOSIVE DESTRUCTION SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS***

**EDS CREW SUPERVISOR'S STATEMENT**

1. The EDS Crew Supervisor will sign this statement:
  - a. When first assigned as Crew Supervisor of this operation
  - b. When an approved formal or interim change or revision is made
  - c. At least once a quarter during continuing operations
  - d. After an absence from the job in excess of 15 consecutive workdays.
2. I have personally reviewed each of the procedural steps of the SOP and have determined that the procedure can be performed safely, efficiently, and in an environmentally acceptable manner. I have verified that the operators have been trained in their designated areas and have instructed them to follow the SOP without deviation. In the event of an accident, I will notify the Installation Emergency Operations Center, my supervisor, and the Risk Management and Quality Assurance Office of the Program Manager for Chemical Demilitarization.

**SIGNATURE**

**DATE**

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**SOP TITLE: *EXPLOSIVE DESTRUCTION SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS***

**EDS OPERATOR'S STATEMENT**

1. The EDS Operator will sign this statement:
  - a. When first assigned to this operation
  - b. When an approved formal or interim change or revision is made
  - c. At least once a quarter during continuing operations
  - d. After an absence from the job in excess of 15 consecutive workdays.
2. I have read, or have had read to me, and understand the general and specific safety and environmental requirements, personnel, work description, and inspection requirements necessary to accomplish each operation. I have been trained and agree to abide by these instructions throughout this assignment to the operation.
3. I will contact the EDS Crew Supervisor if the operational procedures specified in this SOP cannot be achieved or if the procedures seem to be inadequate in any way.
4. This operation or applicable steps are to be applied as required by the EDS Manager or his/her designee. All environmental, safety, and health requirements shall be adhered to in this procedure.

SIGNATURE

DATE

_____	_____
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CHANGE  
NO.

EDS System Manager, P1U2&3  
Date: May 2003

**STANDING OPERATING PROCEDURE  
FOR  
EXPLOSIVE DESTRUCTION SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS  
CHANGE TRANSMITTAL PAGE**

EXPLOSIVE DESTRUCTION SYSTEM, PHASE 1 UNITS 2 AND 3 is updated as follows:

1. File this sheet in front of the SOP for reference.
2. This change is a result of new operating procedures, site-specific criteria, illustrations, equipment, or supplies.
3. New or updated text is indicated by a vertical bar in the outer margin of the page.
4. Added illustrations are indicated by a vertical bar adjacent to the figure number.
5. Remove old pages and insert new pages as indicated below.

**Remove Pages**

**Insert Pages**

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**STANDING OPERATING PROCEDURE  
FOR  
EXPLOSIVE DESTRUCTION SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS**

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED DATA.

**LIST OF EFFECTIVE PAGES**

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page.

Dates of issue for original and changed pages are:  
Original, Change No. 0, May 2003.

**TOTAL NUMBER OF PAGES IS 326 CONSISTING OF THE FOLLOWING:**

Page No.	*Change No.	Page No.	*Change No.
EDS Cover Page	0	5-13-1 thru 5-13-10	0
Approval Page	0	5-14-1 thru 5-14-16	0
EDS Crew Supervisor's Statement	0	5-15-1 thru 5-15-10	0
EDS Operator's Statement	0	5-16-1 thru 5-16-8	0
EDS Operator's Statement (Continued)	0	5-17-1 thru 5-17-8	0
i thru x	0	5-18-1 thru 5-18-6	0
Cover Page Section 1	0	5-19-1 thru 5-19-12	0
1-1 thru 1-2	0	5-20-1 thru 5-20-4	0
Cover Page Section 2	0	5-21-1 thru 5-21-6	0
2-1 thru 2-2	0	5-22-1 thru 5-22-4	0
Cover Page Section 3	0	Cover Page Annex A	0
3-1 thru 3-2	0	A-1 thru A-8	0
Cover Page Section 4	0	Cover Page Annex B	0
4-1 thru 4-4	0	B-1 thru B-2	0
Cover Page Section 5	0	Cover Page Annex C	0
5-1 thru 5-2	0	C-1 thru C-2	0
5-1-1 thru 5-1-12	0	Cover Page Annex D	0
5-2-1 thru 5-2-10	0	D-1 thru D-4	0
5-3-1 thru 5-3-14	0	Cover Page Annex E	0
5-4-1 thru 5-4-12	0	E-1 thru E-16	0
5-5-1 thru 5-5-4	0	Cover Page Annex F	0
5-6-1 thru 5-6-8	0	F-1 thru F-2	0
5-7-1 thru 5-7-22	0	Cover Page Annex G	0
5-8-1 thru 5-8-4	0	G-1 thru G-2	0
5-9-1 thru 5-9-24	0	Cover Page Annex H	0
5-10-1 thru 5-10-8	0	H-1 thru H-6	0
5-11-1 thru 5-11-12	0	Cover Page Annex I	0
5-12-1 thru 5-12-10	0	I-1 thru I-2	0

\* Zero in this column indicates an original page.

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**STANDING OPERATING PROCEDURE  
FOR  
EXPLOSIVE DESTRUCTION SYSTEM PHASE 1 UNITS 2 AND 3 OPERATIONS**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), located in Annex A, directly to:

EDS P1U2&3 System Manager  
ATTN: SFAE-CD-NM  
Building E4405  
4585 Hoadley Road  
Aberdeen Proving Ground, Maryland 21010-4005.

A reply will be furnished to you.

Request for this document must be referred to EDS P1U2&3 System Manager, ATTN: SFAE-CD-NM, Building E4405, 4585 Hoadley Road, Aberdeen Proving Ground, Maryland 21010-4005.

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## TABLE OF CONTENTS

Section/Paragraph	Title	Page
	CHANGE TRANSMITTAL PAGE.....	i
	LIST OF EFFECTIVE PAGES .....	ii
	TITLE BLOCK PAGE .....	iii
	LIST OF ILLUSTRATIONS .....	vii
	LIST OF TABLES .....	ix
1	EDS PHASE 1 UNITS 2 AND 3 OPERATIONS STATEMENT OF WORK .....	1-1
2	EDS PHASE 1 UNITS 2 AND 3 OPERATIONS ADDITIONAL NONSTANDARD RESPONSIBILITIES.....	2-1
3	EDS PHASE 1 UNITS 2 AND 3 OPERATIONS MATERIALS.....	3-1
4	EDS PHASE 1 UNITS 2 AND 3 OPERATIONS HAZARDS .....	4-1
5	EDS PHASE 1 UNITS 2 AND 3 OPERATIONS PROCEDURES.....	5-1
	PROCEDURE 1    CHECKLISTS FOR ESTABLISHING THE EDS SITE.....	5-1-1
	PROCEDURE 2    CHECKLISTS FOR EDS SETUP PROCEDURES .....	5-2-1
	PROCEDURE 3    PREPARE CHEMICAL REAGENTS.....	5-3-1
	PROCEDURE 4    PREPARE EDS FIRING SYSTEM.....	5-4-1
	PROCEDURE 5    SELECT FRAGMENT SUPPRESSION SYSTEM AND EXPLOSIVES FOR MUNITION.....	5-5-1
	PROCEDURE 6    TRANSFER MUNITION.....	5-6-1
	PROCEDURE 7    ASSEMBLY OF FRAGMENT SUPPRESSION SYSTEM AND MUNITION .....	5-7-1
	PROCEDURE 8    SAMPLE SOLID WASTE .....	5-8-1
	PROCEDURE 9    CLOSING AND SEALING CONTAINMENT VESSEL DOOR .....	5-9-1
	PROCEDURE 10   DETONATE MUNITION.....	5-10-1
	PROCEDURE 11   COLLECT INITIAL VAPOR AND LIQUID SAMPLES .....	5-11-1
	PROCEDURE 12   CHEMICALLY TREAT EDS CONTAINMENT VESSEL CONTENTS .....	5-12-1
	PROCEDURE 13   COLLECT TREATED LIQUID SAMPLE .....	5-13-1
	PROCEDURE 14   REMOVE LIQUID WASTE FROM EDS CONTAINMENT VESSEL.....	5-14-1
	PROCEDURE 15   RINSE CONTAINMENT VESSEL.....	5-15-1
	PROCEDURE 16   COLLECT VAPOR SAMPLE .....	5-16-1
	PROCEDURE 17   OPEN CONTAINMENT VESSEL DOOR.....	5-17-1
	PROCEDURE 18   SAMPLE AND REMOVE SOLID WASTE.....	5-18-1
	PROCEDURE 19   CLEAN AND PREPARE EQUIPMENT .....	5-19-1

---

## TABLE OF CONTENTS (Continued)

Section/Paragraph	Title	Page
PROCEDURE 20	DRAIN SUPPLY TANKS.....	5-20-1
PROCEDURE 21	MONITOR AND DECONTAMINATE THE EDS .....	5-21-1
PROCEDURE 22	BREAK DOWN EDS OPERATIONS AREA.....	5-22-1
ANNEX A	FORMS	
ANNEX B	EXPLOSIVE DESTRUCTION SYSTEM PROCESS ALARMS	
ANNEX C	LABORATORY SAMPLE BOTTLE EXTRACTION PROCEDURE	
ANNEX D	VESSEL ROTATION CONTROL PENDANT OPERATION	
ANNEX E	OLD STYLE FRAGMENT SUPPRESSION SYSTEMS	
ANNEX F	VESSEL TEMPERATURE DISPLAY IMMEDIATE ACTION PROCEDURE	
ANNEX G	ACRONYMS/ABBREVIATIONS	
ANNEX H	JOB HAZARD ANALYSIS	
ANNEX I	REFERENCES	

---

## LIST OF ILLUSTRATIONS

Figure	Title	Page
1-1	Generic Layout for the EDS Site .....	5-1-2
1-2	Generic Exclusion Zone Layout .....	5-1-5
1-3	EDS and Supporting Equipment .....	5-1-8
1-4	EDS Phase 1 Units 2 and 3 Flow Diagram .....	5-1-9
4-1	High Voltage Flange Exterior View.....	5-4-4
7-1	75mm Shell FSS .....	5-7-3
7-2	Livens Projectile FSS .....	5-7-5
7-3	4.2-inch Mortar FSS .....	5-7-9
7-4	Typical Munition FSS .....	5-7-12
7-5	M139 Bomblet FSS .....	5-7-15
7-6	High Voltage Flange Interior View.....	5-7-20
9-1	ASM 142 Helium Leak Detector Control Panel .....	5-9-5
9-2	ASM 142 Helium Leak Detector Remote Control .....	5-9-6
9-3	ASM 120 Helium Leak Detector Control Panel .....	5-9-19
10-1	High Voltage Flange Exterior View.....	5-10-2



---

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## LIST OF TABLES

Table	Title	Page
1-1	Checklist for Selecting the EDS Site .....	5-1-3
1-2	Checklist for Establishing the Site for EDS Operations .....	5-1-4
1-3	Checklist for Establishing the EDS and Supporting Equipment .....	5-1-7
2-1	EDS Setup Preventive Maintenance Checks and Services Checklist for EDS Trailer .....	5-2-2
2-2	Checklist for EDS Pre-Operations.....	5-2-4
2-3	Pre-Operations Checklist for Equipment, Tools, and Supplies.....	5-2-6
2-4	Checklist for Post-Operations.....	5-2-8
3-1	Quantities of Reagent or Solvent Required for Treatment of Chemical Fill .....	5-3-7
22-1	Checklist for EDS Closeout.....	5-22-2

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**SECTION 1**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**STATEMENT OF WORK**



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**SECTION 1**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS STATEMENT OF WORK**

**1. Statement of Work:** Provide for receipt, handling, and preparation for treatment of chemical munitions. Dispose of chemical munitions by explosively opening the munition, detonating any explosive components, treating the chemical fill, or re-containerizing industrial fills.

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**SECTION 2**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**ADDITIONAL NONSTANDARD RESPONSIBILITIES**





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**SECTION 2**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**ADDITIONAL NONSTANDARD RESPONSIBILITIES**

**1. Additional Nonstandard Responsibilities:**

**a. Supervisor Responsibility:**

(1) Assure that all personnel are registered in the occupational health program; have received required training under 29 Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response; and are certified as Explosive Destruction System (EDS) Chemical Operators or EDS Explosive Operators.

(2) Assure that personnel have been informed of their rights under 29 CFR 1910.1200, Hazard Communication Standard, and have been instructed in the proper use of Material Safety Data Sheets (MSDSs) for the chemicals involved.

(3) Assure that a copy of this Standing Operating Procedure (SOP) and all directives, manuals, permits, and other documentation dealing with the operation are available and signed at the worksite.

(4) Assure that adequate medical support has been arranged prior to the start of any operation.

**b. Operators' Responsibility.** Operators must report to their supervisor any violations of the operating procedures and/or conditions or circumstances that are unusual and could adversely impact safety and health.

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**SECTION 3**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**MATERIALS**



---

**SECTION 3**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS MATERIALS**

**1. Materials to be used:**

- a. Personnel decontamination solution:
  - (1) Soap
  - (2) Water
  - (3) Five percent sodium hypochlorite solution (not to be used as an eyewash).
- b. Equipment and material decontaminant solution(s). See Procedure 3.
- c. Agents Involved. Munitions found with unknown liquid as well as suspect chemical agent fills:
  - (1) Incapacitating type agents
  - (2) Blister type agents
  - (3) Blood agents
  - (4) Choking agents
  - (5) Nerve agents
  - (6) Vomiting compounds.

**2. Tools and Equipment to be Used:**

- a. EDS
- b. Items listed in equipment, tools, and supplies section of each procedure
- c. First-aid kit
- d. Means to transport personnel to the supporting medical facility (government vehicle only)
- e. Personal protective equipment (PPE) in accordance with (IAW) the Health and Safety Plan (HASP), as applicable
- f. Communications equipment (see HASP, if applicable).

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**SECTION 4**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**HAZARDS**





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## SECTION 4

### EDS PHASE 1 UNITS 2 AND 3 OPERATIONS HAZARDS

#### 1. Hazards Involved:

a. Refer to the System Hazard Analysis and individual MSDSs for hazards of chemical agents.

b. Specific Hazards.

(1) Munitions. The EDS is equipped to handle the following types of munitions:

(a) Size. From a 75-millimeter (mm) projectile to a Livens projectile (approximately 8 inches in diameter)

(b) Weight. Up to 28 pounds of chemical fill

(c) Configuration. With or without explosive components including those deemed inappropriate to handle by conventional storage and disposal methods (may have in-line firing components with or without positive safeties, unapproved render-safe procedures, be safe only for hand-carrying to a disposal location, or have fills that may polymerize rapidly)

(d) Energetics. With bursters having approximately 1/2-pound trinitrotoluene (TNT) equivalent explosives, or less, whereby the total net explosive weight including the shaped charges does not exceed the 1-pound TNT equivalent capacity of the EDS vessel

(e) Fills. Chemical agents: mustards (H, HS, HD, HQ, HT), lewisite (L), nerve agents (G, GA, GB, VX), and dichloroethylthiodiethylether (T); industrial chemicals: hydrogen cyanide (AC), bromoacetone (BA), bromobenzyl cyanide (CA), phosgene (CG), cyanogen chloride (CK), chlorine gas (Cl<sub>2</sub>), chloroacetophenone (CN), CN in benzene and carbon tetrachloride (CNB), CN and chloropicrin in chloroform (CNS), diphenylchloroarsine (DA), chloropicrin (PS); and tin tetrachloride/PS (NC), PS/CG (PG), CG/phenyldichloroarsine (PD), and smoke-producing compounds.

**2. Safety Requirements:** See HASP, if applicable.

a. Ventilation. The EDS is not equipped with a chemical, biological, and radiological filter system.

b. Monitoring Requirements. Monitoring will be conducted IAW the Monitoring Concept Plan and Site Monitoring Plan.

c. Clothing. PPE will be worn IAW the HASP, if applicable.

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d. First-Aid and Firefighting Equipment:

- (1) Fire extinguishers will be located beside the EDS.
- (2) Approved eyewash capable of providing 15 minutes of flushing will be available onsite.
- (3) First-aid kits will be available onsite.

e. Special Precautions:

- (1) Net explosive weight limits will not be exceeded for the EDS.
- (2) A decontamination apparatus will be provided IAW the support agreement.
- (3) Equipment and tools will be identified, marked, and stored in a suitable place away from items that have not been used in a toxic environment.

**3. Remarks:**

a. The checklists for establishing the EDS site provide some factors to consider when selecting the operational site.

b. Refer to the EDS HASP, if applicable, for detailed Personnel Decontamination Station (PDS) and air monitoring setup procedures.

c. The checklist for EDS equipment setup specifies major activities to accomplish. To find detailed procedures for equipment and systems setup, refer to the EDS Operations and Maintenance (O&M) Procedures and these EDS SOPs, as necessary.

d. The sequence of the setup procedures for equipment may vary depending on the number of operator personnel and the instructions that they received from the EDS Crew Supervisor.

e. The operations explained in this SOP direct the explosive ordnance disposal (EOD)-certified technicians through preparing a munition for processing in the EDS. Preparation of the munition includes transferring custody of the munition to the EDS team, moving the munition, removing the munition overpack (if one is present), assembling the Fragment Suppression System (FSS), taking a sample, and packaging the hazardous waste created during sampling.

f. The operator will receive custody of the munition and complete the appropriate paperwork involved in taking custody of the munition. If the munition is overpacked, it is placed into a hazardous waste catch tray before being removed from the overpack. Once the munition is removed from the overpack, its condition is evaluated for safety. If it is considered unsafe, the munition is rendered safe IAW the applicable EOD Technical Manual 60-series publications. It is then photographed and moved to the munition loading table for FSS/munition assembly. If the munition is not overpacked, it

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is photographed and moved directly to the munition loading table for FSS/munition assembly.

g. The munition is placed into the FSS, the shaped charges are emplaced and connected, the FSS assembly is completed, the FSS (now containing the munition) is loaded into the EDS containment vessel, and all explosive connections are routed through the containment vessel door.

h. Any hazardous waste created while preparing the munition for processing in the EDS is sampled and packaged in a hazardous waste container.

i. The procedures in this SOP are based on normal operational expectations. If a situation not covered by this SOP is encountered, the operator(s) must notify the EDS Crew Supervisor for further guidance. The EDS Crew Supervisor may direct the operators to follow procedures in the SOP or may develop a deviation from the normal operating procedures in the SOP in order to proceed with the operation and eliminate the threat posed by the hazardous munition.

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**SECTION 5**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS**  
**PROCEDURES**



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**SECTION 5**  
**EDS PHASE 1 UNITS 2 AND 3 OPERATIONS PROCEDURES**

**INDEX OF PROCEDURES**

<u>PROC NO.</u>	<u>LOCATION</u>	<u>DESCRIPTION OF PROCEDURES</u>	<u>PAGE NO.</u>
<u>1</u>	<u>EDS SITE</u>	<u>CHECKLISTS FOR ESTABLISHING THE EDS SITE</u>	<u>5-1-1</u>
<u>2</u>	<u>EDS AREA OF OPERATIONS</u>	<u>CHECKLISTS FOR EDS SETUP PROCEDURES</u>	<u>5-2-1</u>
<u>3</u>	<u>EDS TRAILER</u>	<u>PREPARE CHEMICAL REAGENTS</u>	<u>5-3-1</u>
<u>4</u>	<u>EDS TRAILER</u>	<u>PREPARE EDS FIRING SYSTEM</u>	<u>5-4-1</u>
<u>5</u>	<u>EDS TRAILER</u>	<u>SELECT FRAGMENT SUPPRESSION SYSTEM AND EXPLOSIVES FOR MUNITION</u>	<u>5-5-1</u>
<u>6</u>	<u>EDS OPERATIONS AREA</u>	<u>TRANSFER MUNITION</u>	<u>5-6-1</u>
<u>7</u>	<u>EDS TRAILER</u>	<u>ASSEMBLY OF FRAGMENT SUPPRESSION SYSTEM AND MUNITION</u>	<u>5-7-1</u>
<u>8</u>	<u>EDS OPERATIONS AREA</u>	<u>SAMPLE SOLID WASTE</u>	<u>5-8-1</u>
<u>9</u>	<u>EDS TRAILER</u>	<u>CLOSING AND SEALING CONTAINMENT VESSEL DOOR</u>	<u>5-9-1</u>
<u>10</u>	<u>EDS TRAILER</u>	<u>DETONATE MUNITION</u>	<u>5-10-1</u>
<u>11</u>	<u>EDS TRAILER</u>	<u>COLLECT INITIAL VAPOR AND LIQUID SAMPLES</u>	<u>5-11-1</u>
<u>12</u>	<u>EDS TRAILER</u>	<u>CHEMICALLY TREAT EDS CONTAINMENT VESSEL CONTENTS</u>	<u>5-12-1</u>
<u>13</u>	<u>EDS TRAILER</u>	<u>COLLECT TREATED LIQUID SAMPLE</u>	<u>5-13-1</u>



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**INDEX OF PROCEDURES**  
**(CONTINUED)**

<u>PROC NO.</u>	<u>LOCATION</u>	<u>DESCRIPTION OF PROCEDURES</u>	<u>PAGE NO.</u>
<u>14</u>	<u>EDS TRAILER</u>	<u>REMOVE LIQUID WASTE FROM EDS CONTAINMENT VESSEL</u>	<u>5-14-1</u>
<u>15</u>	<u>EDS TRAILER</u>	<u>RINSE CONTAINMENT VESSEL</u>	<u>5-15-1</u>
<u>16</u>	<u>EDS TRAILER</u>	<u>COLLECT VAPOR SAMPLE</u>	<u>5-16-1</u>
<u>17</u>	<u>EDS TRAILER</u>	<u>OPEN CONTAINMENT VESSEL DOOR</u>	<u>5-17-1</u>
<u>18</u>	<u>EDS TRAILER</u>	<u>SAMPLE AND REMOVE SOLID WASTE</u>	<u>5-18-1</u>
<u>19</u>	<u>EDS TRAILER</u>	<u>CLEAN AND PREPARE EQUIPMENT</u>	<u>5-19-1</u>
<u>20</u>	<u>EDS TRAILER</u>	<u>DRAIN SUPPLY TANKS</u>	<u>5-20-1</u>
<u>21</u>	<u>EDS TRAILER</u>	<u>MONITOR AND DECONTAMINATE THE EDS</u>	<u>5-21-1</u>
<u>22</u>	<u>EDS TRAILER</u>	<u>BREAK DOWN EDS OPERATIONS AREA</u>	<u>5-22-1</u>

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## PROCEDURE 1 CHECKLISTS FOR ESTABLISHING THE EDS SITE

These checklists shall be used when establishing the EDS site. The site consists of three zones: the Exclusion Zone, Contamination Reduction Zone, and Support Zone.

Figure 1-1 is a generic layout for the EDS site.

1.0 **USE** the following attached checklists as guides when establishing the EDS site:

- Table 1-1. Checklist for Selecting the EDS Site
- Table 1-2. Checklist for Establishing the Site for EDS Operations
- Table 1-3. Checklist for Establishing the EDS and Supporting Equipment.

# Procedure 1

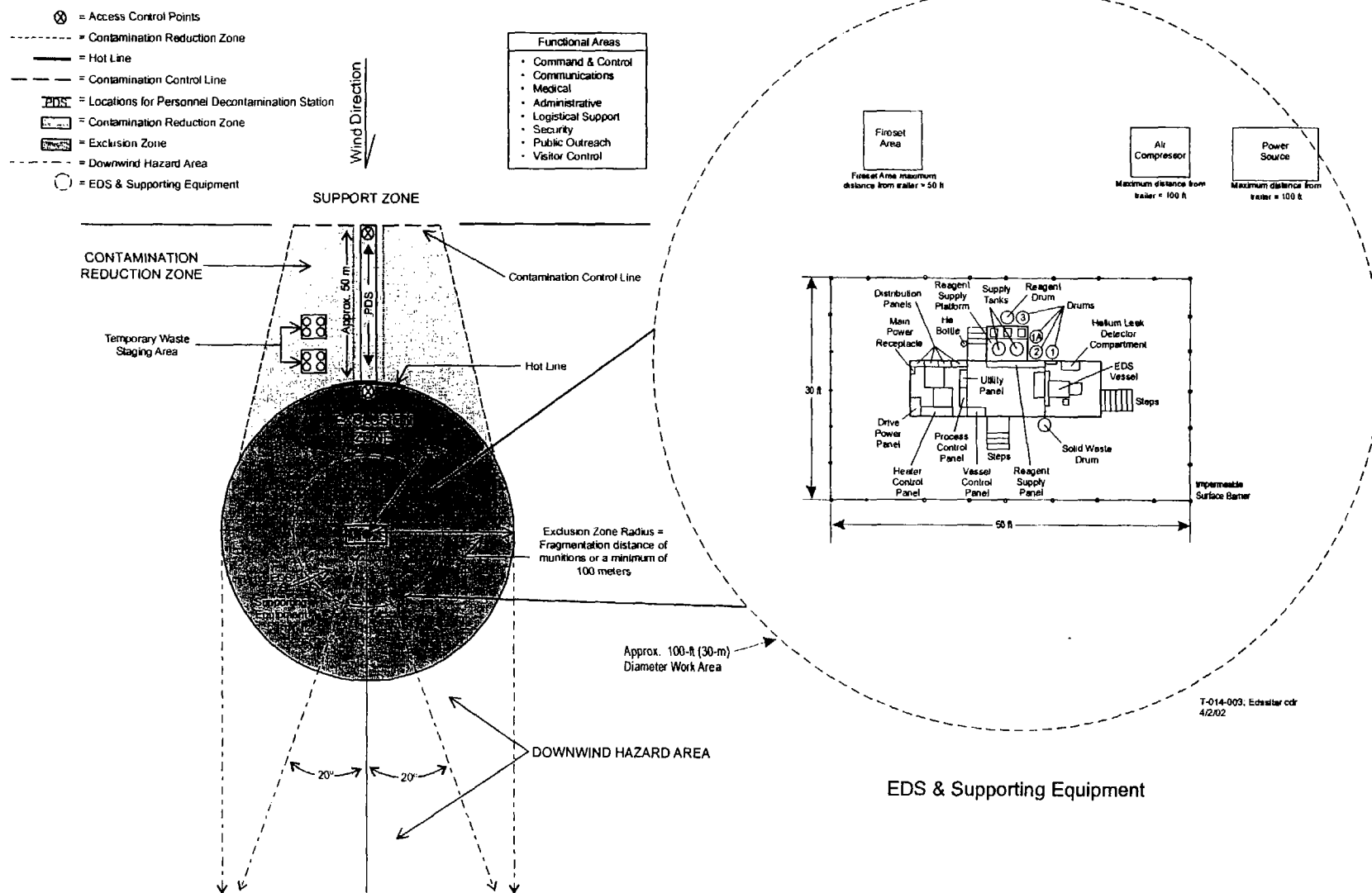


Figure 1-1. Generic Layout for the EDS Site

- 1.1 The EDS site is not a fixed size or place. The purpose of this checklist is to describe some factors to consider when selecting an adequate site.

Table 1-1. Checklist for Selecting the EDS Site

#		Yes	No
1.	Obtain site map of operations area.		
2.	Conduct onsite survey of operations site.		
3.	Note topographical features, prevailing wind direction based on established meteorological conditions, drainage, and location of buildings, containers, impoundment, pits, ponds, and tanks.		
4.	Select location that: (a) Is level and allows for elimination of physical hazards (b) Allows for the setup of the waste staging areas, equipment storage areas, Personnel Decontamination Station, temporary structures for long-term operations (if required), Exclusion Zone, Contamination Reduction Zone, and Support Zone (c) Provides adequate illumination for work activities (d) Is near an adequate electrical power source, potable water supply, and utilities to support administrative areas (e) Allows controlled access to the Contamination Reduction Zone and Exclusion Zone.		
5.	Obtain Site Manager approval.		

- 1.2 The purpose of this checklist is to describe some factors to consider when establishing the site for EDS operations.

**Note**

**See Figure 1-2 for a generic layout of the EDS site Exclusion Zone.**

Table 1-2. Checklist for Establishing the Site for EDS Operations

		Yes	No
<b>EXCLUSION ZONE</b>			
1.	Determine size of the Exclusion Zone (fragmentation distance of the munitions or a minimum of 100 meters).		
2.	Mark the Exclusion Zone (fence, tape, signs, etc.).		
3.	Obtain approval for the size and location of the Exclusion Zone from the Site Manager and EDS Crew Supervisor.		
4.	Establish worksite that will support the weight of the EDS Trailer; waste collection, removal, and staging; munitions unpack and preparation; Firing System setup; and Containment Vessel Leak Detection System setup.		
5.	Establish Access Control Point.		
6.	Establish a hot line boundary between the Exclusion Zone and Contamination Reduction Zone.		
<b>CONTAMINATION REDUCTION ZONE</b>			
7.	Establish the Contamination Reduction Zone upwind of the Exclusion Zone.		
8.	Establish the area for the Contamination Reduction Zone as approximately 50 meters in length from the Exclusion Zone to the boundary of the Support Zone.		
9.	Establish Personnel Decontamination Station.		
10.	Establish Access Control Point.		
11.	Establish suitable waste staging area and Personnel Decontamination Station operations.		
12.	Assure the Contamination Reduction Zone is organized to facilitate emergency response, equipment resupply, sample packaging, small forklift and hauling equipment, and containerization of the water and other liquids that were used during decontamination.		
<b>SUPPORT ZONE</b>			
13.	Establish Support Zone upwind of the Contamination Reduction Zone.		

# Procedure 1

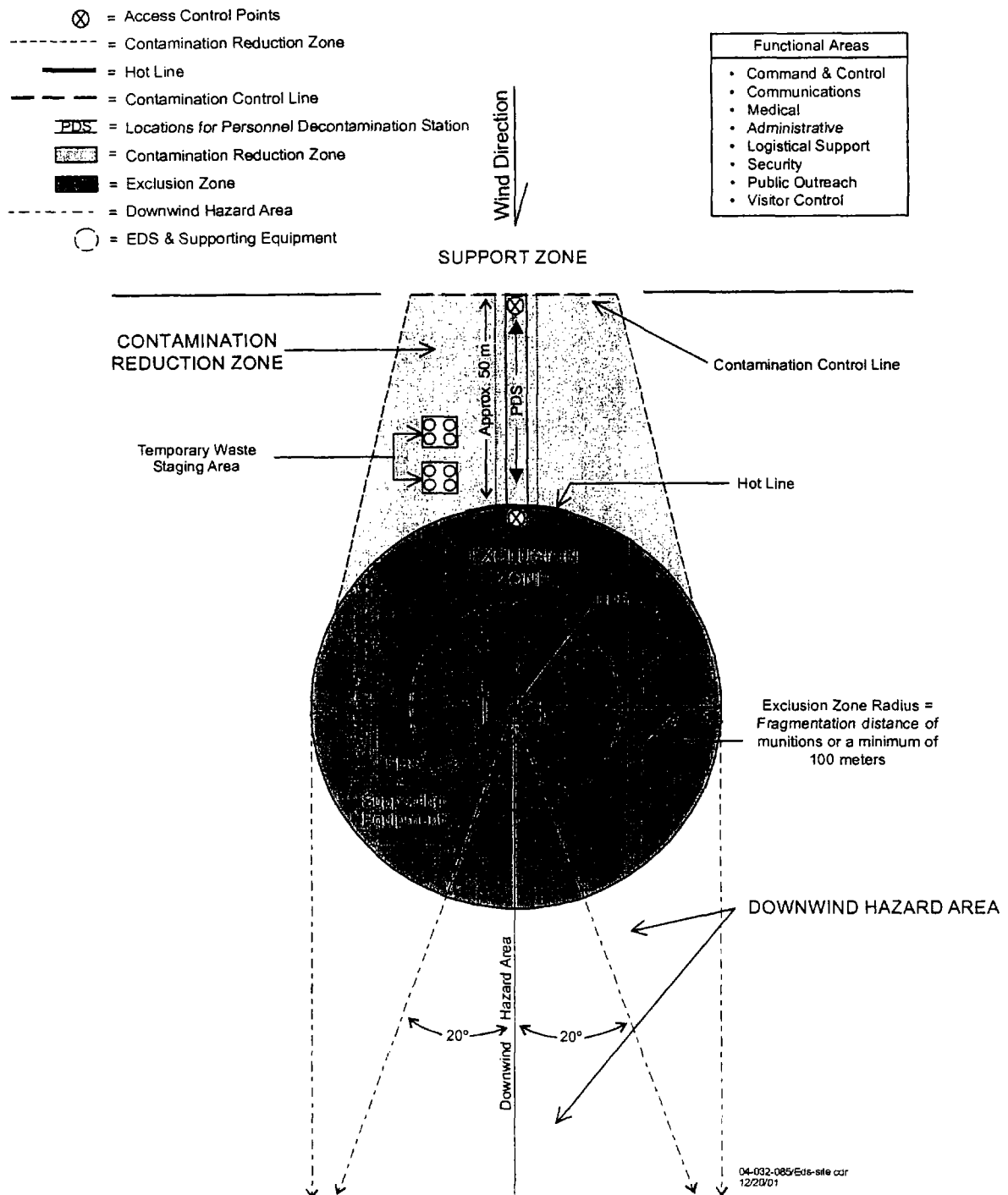


Figure 1-2. Generic Exclusion Zone Layout

- 1.3 The purpose of the following checklist (Table 1-3) is to specify the prerequisites for establishing the EDS and supporting equipment for EDS operations.

**Notes**

**EDS may be located in a structure, facility, or open area. If possible, provide shelter over the EDS Trailer to protect the operators and equipment from the environment and to prevent run-on or accumulation of rainwater in the sumps.**

**If located in an open area, EDS supporting equipment should be located within a 15-meter radius from the center of the EDS Trailer. If located within a facility or structure, then the site shall be large enough to offer uncluttered workspace. Refer to Figures 1-3 and 1-4 for layout of the EDS and supporting equipment.**

Table 1-3. Checklist for Establishing the EDS and Supporting Equipment

#		Yes	No
<b>EDS AND SUPPORTING EQUIPMENT</b>			
1.	Pre-position a portable/collapsible impermeable surface barrier large enough on which to pull the EDS Trailer. Fabricated secondary containment berms may be used around individual items if a large portable/collapsible berm is not available.		
2.	Arrange connections for water and 480-volt, 3-phase, 200-ampere, Delta-connection electrical power for operation.		
3.	Set up location for reagent storage.		
4.	Coordinate with monitoring support.		
5.	Set up spill response supplies, kits, and storage drums.		
6.	Set up air compressor within 100 feet of EDS Trailer.		
<b>PRE-POSITION FIRING SYSTEM</b>			
7.	Position Firing System upwind and within 50 feet of EDS Trailer so that 50-foot detonator cables can easily reach exterior jacks on feedthrough assembly located on containment vessel door flange.		
<b>SET UP MUNITIONS UNPACK AND PREPARATION AREA</b>			
8.	Pre-position approved open-head drums, emergency spill response supplies, spill containment kits, hazardous waste catch tray, and tools.		
9.	Establish workspace for the munitions, munitions containers, Fragment Suppression System, waste dunnage collection, explosive handling equipment, safety equipment, and supplies.		
10.	Set up to provide for unobstructed view and safe movement of personnel.		
<b>SET UP SOLID AND LIQUID WASTE STAGING AREAS</b>			
11.	Establish liquid waste staging area so it connects via effluent hoses to the EDS Trailer.		
12.	Establish a solid waste staging area in close proximity to the EDS Trailer.		
13.	Establish a second liquid and solid waste staging area in either the Containment Reduction Zone or the Support Zone for movement of waste from the Exclusion Zone to the staging area for waste awaiting disposal.		
14.	Assure waste staging areas allow for access for a small forklift or dolly.		
15.	Maintain adequate space within the waste staging area for transfer, observation, and inspection of the waste containers.		
16.	Assure waste staging areas are diked and ground is covered with an impermeable surface barrier, if required.		
17.	Assure hazardous waste labels are placed on all waste containers and are properly marked and discernible.		
18.	Position all waste drums on containment pallets.		
19.	Assure open-head and liquid waste drums are segregated and identified.		
20.	Complete and keep chain-of-custody records for waste generation, staging, and disposal on file at site.		
<b>PORTABLE POWER SUPPLY</b>			
21.	If portable power supply is required, set up in accordance with vendor instructions.		
22.	Locate the fire extinguisher in proximity to portable power supply.		

Signature: EDS Crew Supervisor

Date/Time



## Procedure 1

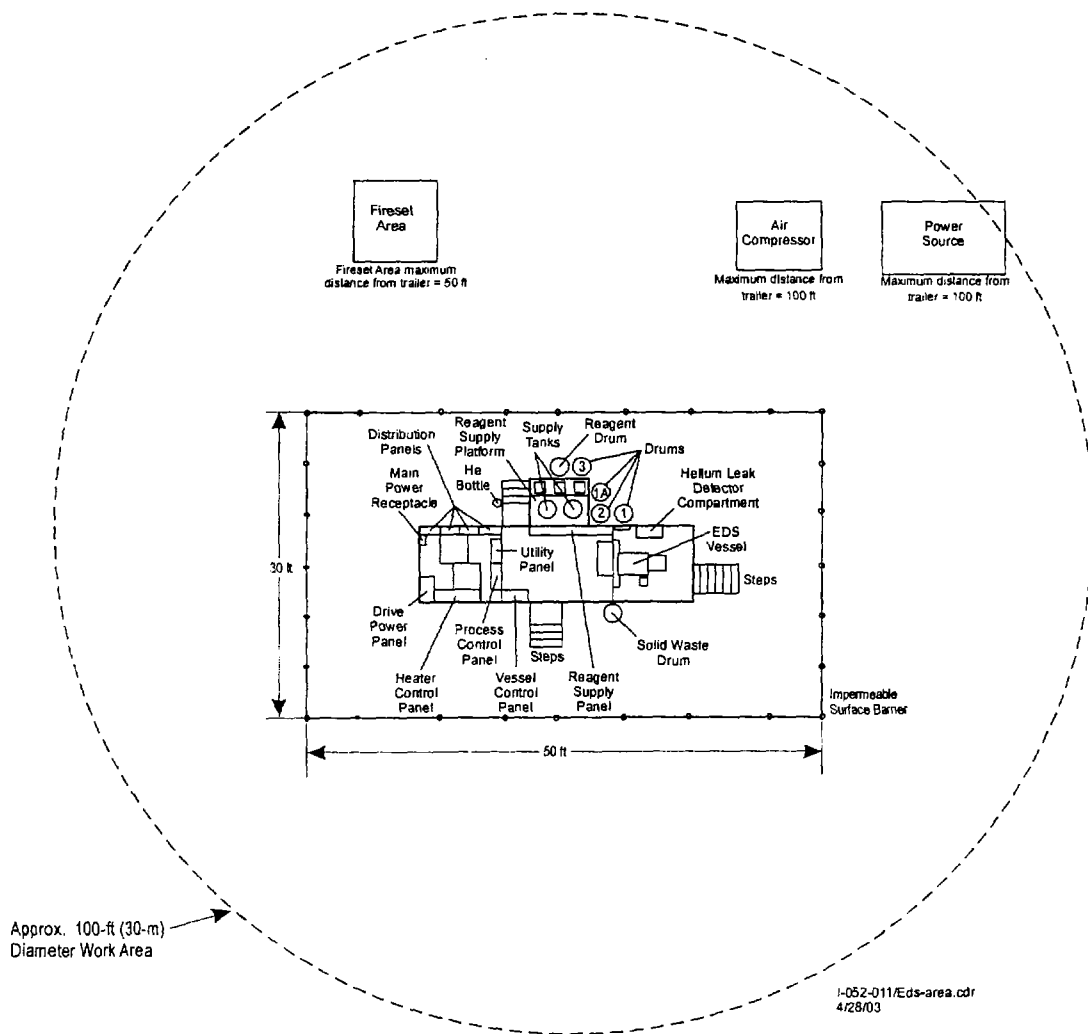


Figure 1-3. EDS and Supporting Equipment

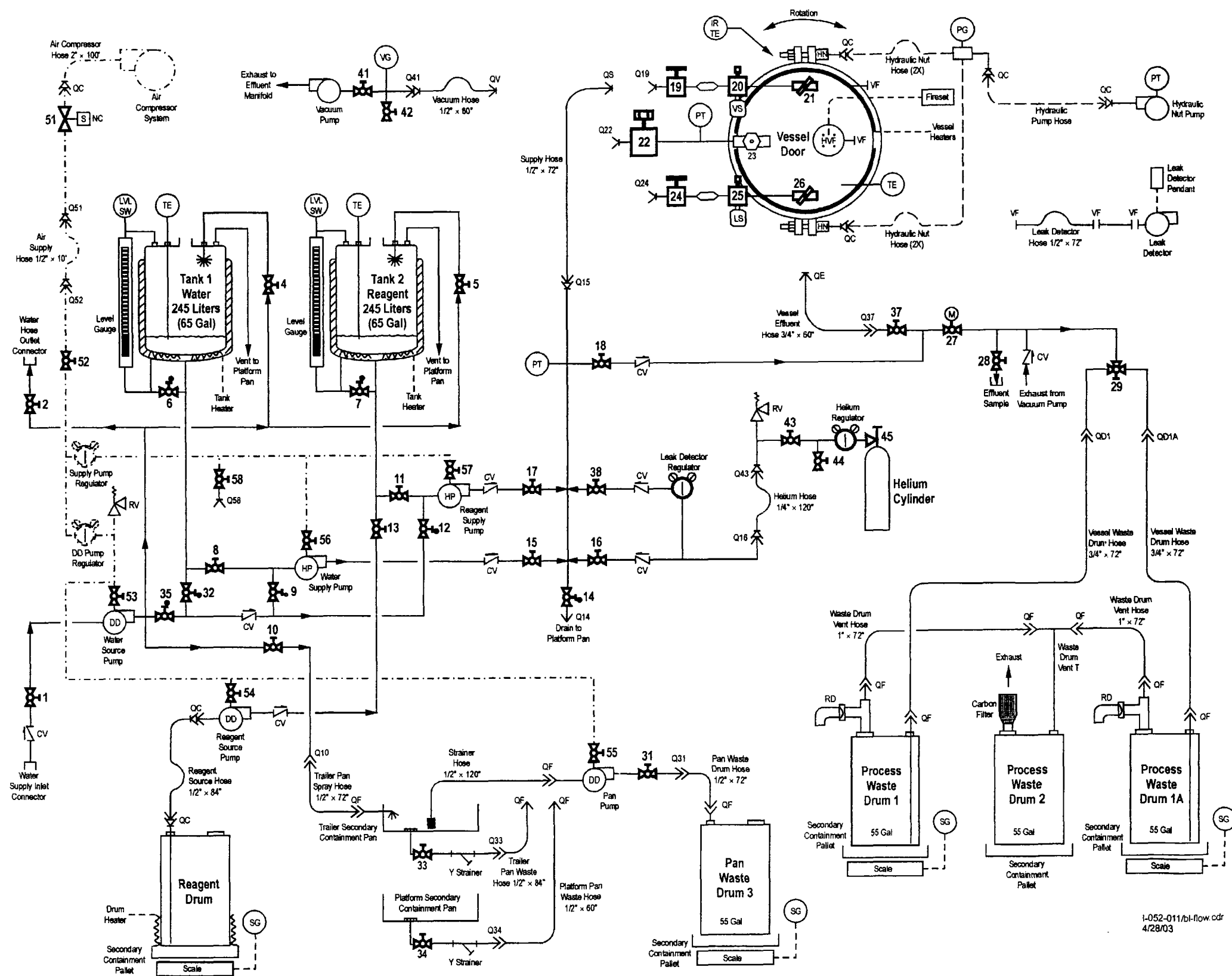


Figure 1-4. EDS Phase 1 Units 2 and 3 Flow Diagram

SPECIAL REQUIREMENTS:

1. Operators are familiar with chemical accident/incident procedures and the EDS O&M Procedures data source manual.
2. The checklists will be used by EDS Explosive Operators and/or Chemical Operators knowledgeable in chemical accident/incident response and assistance operations. The operators shall be trained in the conduct of EDS O&M Procedures to include setup of the EDS.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

QUANTITY:

Clipboard and pen	as required
Map of the operational area	1 each
Engineer tape	as required
Marking stake	as required
Poster board or sign materials	as required
Measuring tape	as required
EDS O&M Procedures	as required

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## PROCEDURE 2 CHECKLISTS FOR EDS SETUP PROCEDURES

The purpose of this procedure is to provide a guide to determine if the actions were completed for the initial setup of the EDS Trailer, daily startup, and daily post-munition operations closeout.

- 1.0 **USE** Table 2-1, EDS Setup Preventive Maintenance Checks and Services Checklist for EDS Trailer, to check whether initial EDS setup was accomplished upon first arrival to the EDS site.
- 2.0 **USE** Table 2-2, Checklist for EDS Pre-Operations, to assure pre-operational checks were completed prior to the start of each disposal operation.
- 3.0 **USE** Table 2-3, Pre-Operations Checklist for Equipment, Tools, and Supplies, to assure appropriate items are on-hand prior to the start of each disposal operation.
- 4.0 **USE** Table 2-4, Checklist for Post-Operations, to assure post-operational checks are completed at the end of each disposal operation.

Table 2-1. EDS Setup Preventive Maintenance Checks and Services Checklist for EDS Trailer

#	ACTIVITY	See Table 4-1 in the EDS O&M Procedures Manual	Yes	No
1.	<b>POSITION</b> and <b>DISENGAGE</b> trailer.	EDS Setup PMCS No. 1.1		
2.	<b>REMOVE</b> tarp from trailer.	EDS Setup PMCS No. 1.2		
3.	<b>FOLD DOWN</b> and <b>SECURE</b> trailer steps and Reagent Supply Platform.	EDS Setup PMCS Nos. 1.3 and 1.4		
4.	<b>REMOVE</b> containment vessel tie-down straps and shipping brace.	EDS Setup PMCS No. 1.5		
5.	<b>INSPECT</b> trailer and containment vessel supports.	EDS Setup PMCS No. 1.6		
6.	<b>INSPECT</b> and <b>CONNECT</b> electrical power to trailer. Have a qualified electrician <b>CONNECT</b> electrical power to trailer and assure it is properly grounded.	EDS Setup PMCS No. 1.7		
7.	<b>CONNECT</b> air supply to trailer, <b>SET UP</b> air compressor, and <b>TEST</b> air compressor.	(1) EDS Setup PMCS No. 1.8 (2) Vendor Manual		
8.	<b>CONNECT</b> water supply to trailer. <b>ASSURE</b> all valves are closed. <b>CHECK</b> oil level and oil condition in both air lubricators.	EDS Setup PMCS No. 2		
9.	<b>SET UP</b> and <b>CONNECT</b> lighting fixtures in each corner of the EDS Trailer.	N/A		
10.	<b>SET UP</b> and <b>INSPECT</b> waste drums with spill containment pallets and scales.	EDS Setup PMCS Nos. 3 and 3.1		
11.	<b>SET UP</b> and <b>INSPECT</b> Reagent Supply Subsystem.	EDS Setup PMCS Nos. 4 and 4.1		
12.	<b>OPEN</b> and <b>INSPECT</b> containment vessel door. <b>INSTALL</b> internal containment vessel door hardware.	EDS Setup PMCS No. 5		
13.	<b>CONNECT</b> , <b>TEST</b> , and <b>INSPECT</b> hydraulic nuts.	EDS Setup PMCS Nos. 6 and 6.1		
14.	<b>INSPECT</b> and <b>TEST</b> Rotary Agitation Subsystem.	EDS Setup PMCS No. 7		
15.	<b>TEST</b> containment vessel heaters.	EDS Setup PMCS No. 8		
16.	<b>ATTACH</b> helium cylinder retainer bracket and <b>SET UP</b> helium compressed gas cylinder.	EDS Setup PMCS No. 9		
17.	<b>SET UP</b> helium leak detector. <b>SET</b> helium cylinder regulator at 250 pounds per square inch gauge (psig) and leak detector regulator at 60 psig.	(1) EDS Setup PMCS No. 10 (2) Leak Detector User's Manual		
18.	<b>INSTALL</b> Tedlar <sup>®</sup> bag/vapor/liquid sample valve assemblies, as required.	EDS Setup PMCS No. 11		
19.	<b>INSPECT</b> and <b>LEAK TEST</b> containment vessel door seal, door valves, fittings, high voltage flange, and flange seal.	EDS Setup PMCS No. 12		
20.	<b>OPEN</b> containment vessel door.	EDS Setup PMCS No. 13		

Table 2-1. EDS Setup Preventive Maintenance Checks and Services  
Checklist for EDS Trailer (Continued)

#	ACTIVITY	See Table 4-1 in the EDS O&M Procedures Manual	Yes	No
21.	<b>PREPARE</b> Firing System: <ul style="list-style-type: none"> <li>Preliminary setup of Firing System</li> <li>Install 50-foot detonator cables to containment vessel door.</li> </ul>	EDS Setup PMCS Nos. 14.1 and 14.2		
22.	<b>TEST</b> Firing System: <ul style="list-style-type: none"> <li>Continuity checks of Firing System</li> <li>High potential test of Firing System</li> <li>Dry Run Load Test</li> <li>Firing System shutdown.</li> </ul>	EDS Setup PMCS No. 15 EDS Setup PMCS No. 16 EDS Setup PMCS No. 17.1 EDS Setup PMCS No. 17.2		
23.	If desired, <b>DISCONNECT</b> and <b>SECURE</b> Firing System.	EDS Setup PMCS No. 18		
24.	<b>INSPECT</b> loading table.	EDS Setup PMCS No. 19		

Signature: EDS Crew Supervisor

Date/Time

Table 2-2. Checklist for EDS Pre-Operations

#	ACTIVITY	Yes	No															
1.	<b>VERIFY</b> monitoring is being conducted. <u>Monitoring Equipment</u> <u>Time Online</u> MINICAMS® _____ Depot Area Air Monitoring System _____																	
2.	<b>DETERMINE</b> personal protective equipment (PPE) selection based on overnight monitoring results or Health and Safety Plan if overnight monitoring is not conducted. Required PPE Occupational Safety and Health Administration (OSHA) Level: _____ Cascade operational: _____ YES _____ NO _____ N/A																	
3.	<b>CONDUCT</b> EDS team and safety meetings.																	
4.	<b>ASSURE</b> Personnel Decontamination Station is operational.																	
5.	<b>VERIFY</b> all valve handles are tight on valve stems. <b>ASSURE</b> all manually operated valves are closed. <b>Note:</b> Before continuation of a previous day's processing, <b>OPEN</b> any valves that were closed the previous day for system shutdown.																	
6.	<b>CHECK</b> and <b>TURN ON</b> air compressor and power generator. <b>OPEN</b> valve 52. <b>VERIFY</b> incoming air pressure is 100 pounds per square inch gauge (psig) at the air compressor and air pressure is set at 80 psig at the air lubricators air pressure gauge.																	
7.	<b>TURN ON</b> electrical power main disconnect switch, heater disconnect switch, and water supply to trailer. <b>PERFORM</b> Lamp Test.																	
8.	<b>ASSURE</b> helium bottle contains a minimum of 1,000 psig. _____ psig. <b>ASSURE</b> helium cylinder regulator is set at 250 psig and leak detector regulator low pressure gauge is set at 60 psig.																	
9.	<b>CHECK</b> oil in helium leak detector. <b>TURN ON</b> and <b>CALIBRATE</b> helium leak detector. Refer to EDS Operations and Maintenance (O&M) Manual, EDS Setup PMCS No. 10. <b>VERIFY</b> helium leak detector is turned off.																	
10.	<b>PRE-POSITION</b> decontaminant pail and rinse pail next to sample table.																	
11.	<b>SET UP</b> waste drums on the containment pallets and weight scales. Refer to EDS O&M Manual, EDS Setup PMCS No. 3. <b>OPEN</b> and <b>POSITION</b> valve 29 to QD1. <b>Note:</b> <b>ASSURE</b> carbon filter cap is removed and carbon retaining collar is tightly screwed in drum 2 filter. <b>ASSURE</b> vessel waste drum hoses are connected from quick-connects QD1 and QD1A to drums 1 and 1A, respectively. <b>ASSURE</b> waste drum vent hoses from drums 1 and 1A are connected to waste drum vent T on drum 2. <b>VERIFY</b> valve 27 green OPEN light is illuminated. <table border="0" style="width: 100%;"> <tr> <td style="text-align: left;"><u>Waste Drum</u></td><td style="text-align: left;"><u>Label Number</u></td><td style="text-align: left;"><u>Initial Weight (lbs)</u></td></tr> <tr> <td>1</td><td>_____</td><td>_____</td></tr> <tr> <td>1A</td><td>_____</td><td>_____</td></tr> <tr> <td>2</td><td>_____</td><td>_____</td></tr> <tr> <td>3</td><td>_____</td><td>_____</td></tr> </table>	<u>Waste Drum</u>	<u>Label Number</u>	<u>Initial Weight (lbs)</u>	1	_____	_____	1A	_____	_____	2	_____	_____	3	_____	_____		
<u>Waste Drum</u>	<u>Label Number</u>	<u>Initial Weight (lbs)</u>																
1	_____	_____																
1A	_____	_____																
2	_____	_____																
3	_____	_____																
12.	<b>FILL</b> reagent and water tanks. Refer to Procedure 3. Tank 1 Fill: _____ Liters: _____ Temp. Setpoint: _____ Tank 2 Fill: _____ Liters: _____ Temp. Setpoint: _____ Containment Vessel Temp. Setpoint: _____ ( <b>CHECK</b> all setpoints °C)																	



Table 2-2. Checklist for EDS Pre-Operations (Continued)

#	ACTIVITY	Yes	No
13.	<b>ASSURE</b> vessel hinge jack support is properly positioned.		
14.	<b>INSPECT</b> vessel interior for the presence of foreign objects and/or damage, and <b>REMOVE</b> seal protector.		
15.	<b>CLEAN</b> and <b>PREPARE</b> containment vessel sealing surfaces. Refer to EDS O&M Manual, Table 4-2, Pre-Op PMCS No. 3.		
16.	<p><b>INSTALL</b> Tedlar® bag adaptor/vapor and liquid sample valve assemblies on valve panel. Refer to Procedure 9, Steps 11.0 and 12.0.</p> <p><b>Note:</b> <b>USE</b> thread lubricant on external threads of valve piping before installation of vapor and liquid sample valves. <b>CHECK</b> torque (30 foot-pounds) on all valve fittings between valves 19 and 21, and 24 and 26.</p> <p>Tedlar® bag numbers: _____ : _____</p> <p>_____ : _____</p> <p>Liquid sample valve assembly: _____ : _____</p> <p>_____ : _____</p>		
17.	<b>PREPARE</b> EDS Firing System (refer to Procedure 4).		
18.	<p><b>TEST</b> EDS Firing System (refer to Procedure 4):</p> <ul style="list-style-type: none"> <li>• Continuity checks of Firing System</li> <li>• High potential test of Firing System</li> <li>• Dry Run Load Test (if applicable).</li> </ul>		
19.	<b>INSTALL</b> new O-ring. <b>INSTALL</b> metal seal in accordance with EDS O&M Procedures, Table 4-2, Pre-Op PMCS No. 3.		
20.	<b>CHECK</b> air lubricator oil levels and oil condition.		
21.	<b>SECURE</b> loading table to grating (refer to Procedure 5).		
22.	<b>PRE-POSITION</b> Fragment Suppression System cylinder top and frame/cylinder bottom assembly, assembled interior detonator jack assembly, and explosives based on munition expected for treatment (refer to Procedure 5).		
23.	<b>PREPARE</b> labels for Tedlar® bags, sample valve assemblies, and bottles in accordance with Sampling and Analysis Plan.		
24.	<b>PREPARE</b> labels for waste drums in accordance with Sampling and Analysis Plan.		
25.	<b>VERIFY</b> all valves are closed except for valves 1, 8, 11, 27, 29, 43, 52, and 53.		
26.	<b>VERIFY</b> lithium ion batteries are charged and <b>TURN ON</b> radio frequency transmitter.		
27.	<b>VERIFY</b> all panel pressure gauges are set at zero.		
28.	<b>COORDINATE</b> with Monitoring prior to start of operations.		
29.	<b>COORDINATE</b> with Site Manager prior to start of operations.		
30.	<b>COORDINATE</b> with emergency response personnel.		
31.	<b>BEGIN</b> operations at Procedure 6.		

Signature: EDS Crew Supervisor

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Date/Time

Table 2-3. Pre-Operations Checklist for Equipment, Tools, and Supplies

ON HAND	QTY	ON HAND	QTY
50-foot detonator cables		Hose, air supply 1/2" x 10'	
5-gallon water can		Hose, garden	
Air compressor		Hose, helium 1/4" x 120"	
Alternate tool kit		Hose, helium leak detector 1/2" x 72"	
Battery, lithium ion		Hose, helium leak detector/extension pipe	
Bleach solution		Hose, hydraulic pump	
Brushes		Hose, hydraulic nut	
Burst disc cables		Hose, pan waste drum	
Carbon filter		Hose, platform pan waste 1/2" x 60"	
Carpenter's level		Hose, reagent source 1/2" x 84"	
Catch tray (unpack area)		Hose, strainer 1/2" x 120"	
Chain-of-custody documents (for munition and sampling)		Hose, supply 1/2" x 72"	
Chock blocks		Hose, trailer pan spray 1/2" x 72"	
Conical-shaped charges with O-rings		Hose, trailer pan waste 1/2" x 84"	
Crow's-foot wrench		Hose, vacuum 1/2" x 60"	
Conical-shaped charge detonator clips		Hose, vessel effluent 3/4" x 60"	
Debris pan		Hose, vessel waste drum 3/4" x 72"	
Digital camera		Hoses, waste drum vent 1" x 72"	
Drain plug wrench		Indelible ink pens	
Drum pump (backup)		Interior and exterior shorting jacks	
Duct tape		Key, vessel control panel	
Dust caps		Leather gloves	
EDS operator log		Linear-shaped charge	
Emergency eye wash		Linear-shaped charge detonator clips	
Fire extinguishers		Linear-shaped charge retaining clips	
Firing Systems (A and B)		Loading table	
First aid kit		Mechanical fingers	
Feedthrough assembly		Multimeter (fluke)	
Fragment Suppression System		O-ring, high-voltage flange	
Grayloc® metal seals		O-ring, vessel door	
Hand truck		Open-head and liquid waste drums	
Helium compressed gas tank with pressure regulator assembly and cylinder bracket		Pendant, hydraulic nut pump	
Hoe, vessel		Pendant, leak detector	
Hose, air compressor 2" x 100'		Pendant, vessel rotation control	

Table 2-3. Pre-Operations Checklist for Equipment, Tools, and Supplies (Continued)

ON HAND	QTY	ON HAND	QTY
Perma-Slik® lube		Spanner wrench, 3-1/2" nut	
Plastic bags and sheeting		Spill containment tray	
Plaster-of-Paris bandages		Spill kit	
Personal protective equipment in accordance with Health and Safety Plan		Sponges	
Primary tool kit		Strain relief clips (large binder clips)	
Rags		Strap wrench	
Reagent		Stepladder	
Rubber mallet		Tongs	
Rupture disc assembly and disc		Trailer lighting fixtures	
Sample valve assembly, 25 milliliters		Waste bag	
Sample valve assembly, 10 milliliters		Waste drum vent T	
Sampling containers and secondary packaging		Waste labels	
Sampling tools		Wooden box (explosive components)	
Scales		Wrench, T-handle 1-5/16-inch	
Secondary containment pallet		Wrench, T-handle 5/8-inch	
Spanner wrench, lock ring			

Signature: EDS Crew Supervisor

Date/Time

Table 2-4. Checklist for Post-Operations

#	ACTIVITY	Yes	No
1.	<b>VERIFY</b> that the following power switches are in the OFF position: <ul style="list-style-type: none"> <li>• Supply pumps</li> <li>• Source pumps</li> <li>• Rotary Agitation Subsystem</li> <li>• Pan pump</li> <li>• Tank and vessel heaters</li> <li>• Helium Leak System</li> <li>• Firing System</li> <li>• Radio frequency transmitter.</li> </ul>		
2.	<b>TURN OFF</b> water supply to trailer.		
3.	<b>ASSURE</b> all waste is placed in proper containers and sealed.		
4.	<b>ASSURE</b> waste drums are properly annotated and placed in the appropriate staging area. <b>Note:</b> If waste drum filter remains in place, it should be capped. Do not install cap if drum is above ambient temperature.		
5.	<b>VERIFY</b> vessel door is open and the green Teflon®-coated training/shipping metal seal and door hinge support jack are in place.		
6.	<b>ASSURE</b> tools, equipment, and supplies are put in their proper place.		
7.	<b>RECOIL</b> 50-foot detonator cables and <b>STORE</b> along with the interior and exterior detonator shorting jacks and exterior detonator jack in the EDS Firing System accessory drawer.		
8.	<b>ASSURE</b> front and back covers have been replaced on EDS Firing System, if necessary.		
9.	<b>ASSURE</b> security is coordinated for EDS Trailer and equipment.		
10.	<b>COORDINATE</b> with monitoring prior to vacating operations area.		
11.	<b>COORDINATE</b> with Site Manager prior to vacating operations area.		

Signature: EDS Crew Supervisor

Date/Time

SPECIAL REQUIREMENTS:

1. Operators are familiar with chemical accident/incident procedures and the EDS O&M Procedures (source data manual).
2. This procedure guide will be used by EDS Explosive Operators and/or Chemical Operators knowledgeable in chemical accident/incident response and assistance operations.
3. The certified operators shall be trained in the conduct of EDS O&M Procedures to include setup of the EDS.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

QUANTITY:

Clipboard and pen  
EDS O&M Manual

as required  
as required

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### PROCEDURE 3 PREPARE CHEMICAL REAGENTS

The purpose of this procedure is to prepare the two supply tanks located on the folding platform of the EDS Trailer with the appropriate reagent and water for later transfer to the containment vessel. Reagent or solvent is selected based on portable isotopic neutron spectroscopy (PINS) chemical fill results of the munition to be destroyed and using Table 3-1 as a reference. The reagent or solvent is loaded in tank 2.

#### PRECONDITIONS:

1. PPE to be worn IAW the HASP, if applicable, and/or as specified in the applicable MSDS for reagent or solvent being transferred.
  2. All valves on vessel door, reagent supply platform, and reagent supply panel (except valve 29), are CLOSED.
- 1.0 **FILL** supply tanks with chemical reagent, solvent, or water (Table 3-1) as follows:
- 1.1 **VERIFY** valves 2, 10, and 35 are CLOSED.

#### Caution

**Chemicals will overflow from supply tanks if filled above 247 liters (65 gallons).**

#### Notes

**Tank 1 is for water only.**

**Tank 2 is used for chemical reagents, solvents, or water.**

- 1.2 **PREPARE** to fill tank 1 with water by opening valve 1.

1.3 **VERIFY** AIR COMPRESSOR SYSTEM is operating as follows:

1.3.1 **VERIFY** quick-connect QC is connected to AIR COMPRESSOR HOSE and AIR SUPPLY PLATFORM HOSE is connected between Q51 and Q52.

1.3.2 **VERIFY** valve 52 is open.

**Note**

**If sufficient pressure is supplied by water supply source, use of water source pump may not be necessary to fill water tanks. In this case, proceed to Step 1.4.**

1.3.3 **TURN ON** AIR COMPRESSOR SYSTEM and then **OPEN** valve 53 to start WATER SOURCE PUMP.

1.4 **FILL** supply tank(s) as follows:

1.4.1 **PROCEED** to Step 1.4.1.1 to fill tank(s) through spray nozzle with water.

1.4.1.1 **FILL** tank 1 by opening valve 4 or **FILL** tank 2 by opening valve 5.

1.4.1.2 **FILL** tank(s) with water until desired volume is reached.

**Note**

**Filling above 247 liters (65 gallons) will cause amber HIGH light on process control panel to illuminate.**

1.4.1.3 **OBSERVE** appropriate TANK LEVEL GAUGE(S) to prevent filling above 247 liters (65 gallons).

1.4.2 **PROCEED** to Step 4.0 for alternate tank filling procedure.

1.5 **STOP** WATER SOURCE PUMP by closing valve 4 for tank 1 and/or valve 5 for tank 2.



**WARNING**

**REAGENT AND SOLVENT CHEMICALS ARE HAZARDOUS. WEAR APPROPRIATE PPE WHEN HANDLING REAGENTS AND SOLVENTS. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.**

- 1.6 **FILL** tank 2 with chemical reagent or solvent (Table 3-1) as follows:
  - 1.6.1 **VERIFY** valves 7 and 11 are CLOSED.
  - 1.6.2 **POSITION** chemical reagent/solvent container at side of trailer.
  - 1.6.3 **CONNECT** reagent source hose between quick-disconnect fitting at REAGENT SOURCE PUMP and quick-disconnect fitting located on chemical reagent/solvent container.
  - 1.6.4 **START REAGENT SOURCE PUMP** by opening valve 54.  
**PROCEED** as follows:
    - 1.6.4.1 **PROCEED** to Step 1.6.5 when pump is operating correctly.
    - 1.6.4.2 **PROCEED** to Step 5.0 when pump is not operating correctly.
  - 1.6.5 **OPEN** valve 13 (tank 2).
  - 1.6.6 **FILL** tank until desired volume is reached.

**Note**

**Filling above 247 liters (65 gallons) will cause amber HIGH light on process control panel to illuminate.**

- 1.6.7 **OBSERVE** appropriate TANK LEVEL GAUGES to prevent filling above 247 liters (65 gallons).
- 1.6.8 **CLOSE** valve 13.
- 1.6.9 **STOP REAGENT SOURCE PUMP** by closing valve 54.

1.7 **RECORD** tank volumes, contents, and temperature setpoints onto Pre-Operations Checklist.

2.0 **PREPARE** to heat supply tank water/reagents IAW Table 3-1 as follows:

**Caution**

**Do not heat solvents unless directed by EDS Crew Supervisor.**

2.1 **INSPECT** TANK HEATER CONTROLS on PROCESS CONTROL PANEL as follows and **VERIFY** red OFF buttons are illuminated.

**Caution**

**Do not turn on a supply tank heater if there is less than 30 liters of liquid in the tank.**

2.2 **TURN ON** supply tank heater(s) as follows:

2.2.1 **VERIFY** setpoint temperature for supply tank heater(s) is set IAW Table 3-1 and **PROCEED** as follows:

2.2.1.1 When setpoint temperature is IAW Table 3-1, **PROCEED** to Step 2.2.2.

2.2.1.2 When setpoint temperature is not IAW Table 3-1, **ADJUST** setpoint temperature as needed with setpoint temperature modification arrows located on the VESSEL HEATER CONTROL panel. **PROCEED** to Step 2.2.2.

2.2.2 **PUSH** green ON button(s) on HEATER CONTROL panel(s) to turn on tank heater(s).

2.2.3 **OBSERVE** and **MONITOR** temperature displayed for supply tank(s) to verify that desired heater(s) are ON and operating.

3.0 **OPEN** transfer lines from supply tanks to REAGENT SUPPLY PANEL to conduct operations as follows:

3.1 **OPEN** valve 8 for tank 1.

3.2 **OPEN** valve 11 for tank 2.

**ALTERNATE PROCEDURE:**

4.0 If necessary, **FILL** tank(s) from the bottom as follows:

4.1 **VERIFY** that valves 2, 4, and 5 are CLOSED.

4.2 **VERIFY** that valves 8, 9, 10, and 12 are CLOSED.

4.3 **FILL** supply tank(s) as follows:

4.3.1 **VERIFY** valve 1 is open. **OPEN** valves 35 and 32 for tank 1 and/or valves 35, 12, and 11 for tank 2.

4.3.2 **FILL** tank(s) until desired volume is reached.

**Note**

**Filling above 247 liters (65 gallons) will cause amber HIGH light on process control panel to illuminate.**

4.3.3 **OBSERVE** appropriate TANK LEVEL GAUGES(S) to prevent filling above 247 liters (65 gallons).

4.4 **STOP** WATER SOURCE PUMP as follows:

4.4.1 **CLOSE** valves 35 and 32 for tank 1 and/or valves 35 and 12 for tank 2.

4.4.2 **OPEN** valve 8.

4.5 **RETURN** to Step 1.7 when tanks are FILLED.

5.0 If necessary, **FILL** tank 2 using DRUM PUMP as follows:

5.1 **VERIFY** that valves 5, 9, 12, 13, 14, and 54 are CLOSED.

5.2 **REMOVE** large bung plug from chemical reagent/solvent container.

- 5.3 **PLACE** DRUM PUMP into chemical reagent/solvent container and **CONNECT** power cord to trailer electrical outlet.
- 5.4 **DISCONNECT** reagent source hose from supply drum dip tube and **CONNECT** it to the DRUM PUMP.
- 5.5 **OPEN** valve 13.
- 5.6 **COMMENCE** to fill tank 2 as follows:
  - 5.6.1 **START** DRUM PUMP. **ADJUST** transfer rate by turning knob on DRUM PUMP, as needed.
  - 5.6.2 **OBSERVE** tank 2 TANK LEVEL GAUGE to prevent filling above 247 liters (65 gallons).
- 5.7 **STOP** filling tank 2 as follows:
  - 5.7.1 **STOP** DRUM PUMP.
  - 5.7.2 **CLOSE** valve 13.
- 5.8 **RETURN** to Step 1.7 when tank 2 is FILLED.

SPECIAL REQUIREMENTS:

- 1. PPE to be worn IAW the HASP, if applicable, and/or as specified in the applicable MSDS for reagent or solvent being transferred.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Drum pump assembly	1 each
Absorbent paper towels	as required

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A Chemical Fill Quantity of:			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment	Volume and Weight of Reagent or Solvent Required for Treatment	Volume and Weight of Reagent or Solvent Required for Treatment	
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Acetophenone + Arsenic		Denatured Alcohol or Acetone	95%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.
			100%	148 lbs.	148 lbs.	148 lbs.	
Acetophenone + Benzene Compounds		Denatured Alcohol or Acetone	95%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.
			100%	148 lbs.	148 lbs.	148 lbs.	
Arsenious Chloride	BR	NaOH	20% aq	TBD	TBD	TBD	Not expected as a chemical fill except in mixture (CBR, JBR, VN). Agitate for 1 hour. No heating.
Benzene Compounds		Denatured Alcohol or Acetone	95%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.
			100%	148 lbs.	148 lbs.	148 lbs.	
Benzylcyanide		Denatured Alcohol or Acetone	95%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.
			100%	148 lbs.	148 lbs.	148 lbs.	
Bromoacetone	BA	Denatured Alcohol or Acetone	95%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.
			100%	148 lbs.	148 lbs.	148 lbs.	
Bromobenzylcyanide	BBC or CA	Acetone	100%	85 (22.5)	85 (22.5)	85 (22.5)	Agitate for 1 hour. Do not heat.

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A Chemical Fill Quantity of:			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment:			
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Chloroacetophenone	CN or CAP	Denatured Alcohol	95%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Chloroacetophenone (CN) in Benzene and Carbon Tetrachloride	CNB	Denatured Alcohol	95%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Chloroacetophenone (CN) and Chloropicrin (PS) in Chloroform	CNS	Alcoholic NaOH	See Comments	85 (22.5) 190 lbs.	85 (22.5) 190 lbs.	120 (32) 267 lbs.	For fill quantities 9 pounds and under, use a 1:1 ratio of denatured alcohol and 20% aq NaOH.  For fill quantities over 9 pounds, use a 1:1 ratio of denatured alcohol and 30% aq NaOH.  Agitate for 1 hour. Heating not required.
Chloropicrin (PS) 80%, SnCl <sub>4</sub> (KJ) 20%	NC	Alcoholic NaOH	See Comments	85 (22.5) 190 lbs.	85 (22.5) 190 lbs.	120 (32) 267 lbs.	
Chloropicrin	PS	Alcoholic NaOH	See Comments	85 (22.5) 190 lbs.	85 (22.5) 190 lbs.	120 (32) 267 lbs.	
Chloropicrin (PS) 50%, CG 50% or PS 75%, CG 25%	PG	Alcoholic NaOH	See Comments	85 (22.5) 190 lbs.	85 (22.5) 190 lbs.	120 (32) 267 lbs.	
Chlorine Gas	CL	NaHSO <sub>3</sub>	20% aq	85 (22.5) 216 lbs.	85 (22.5) 216 lbs.	120 (32) 307 lbs.	Heat containment vessel to 104°F (40°C) and agitate for 1 hour.
Chlorobenzene		Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Cyanogen Chloride	CK	NaOH	20% aq	85 (22.5) 230 lbs.	85 (22.5) 230 lbs.	157 (41) 418 lbs.	Agitate for 1 hour. Heating not required.

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A. Chemical Fill Quantity of			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				B. Time and Weight of Reagent or Solvent Required for Treatment			
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Diphenylchloroarsine	DA	Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Diphosgene	DP	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required.
Ethyl Iodoacetate	KSK	Denatured Alcohol	95%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Ethyl Iodoacetate 75%, Ethanol 25%	SK	Denatured Alcohol	95%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Glycerol + Water		Denatured Alcohol, Acetone, or Water	95% 100%	85 (22.5) 148 lbs. 188 lbs.	85 (22.5) 148 lbs. 188 lbs.	85 (22.5) 148 lbs. 188 lbs.	Do not heat except to prevent water from freezing. Dissolve in solvent or water. Agitate for 1 hour.
Hydrocarbons		Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Hydrocarbons + Sulfur		Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Hydrocarbons + Sulfur + Associated Phenols		Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Hydrocarbons + Sulfur + Associated Alcohols		Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A Chemical Fill Quantity of			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment			
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Hydrogen Cyanide	AC	NaOH	20% aq	85 (22.5) 230 lbs.	85 (22.5) 230 lbs.	157 (41) 418 lbs.	Agitate for 1 hour. Heating not required.
Hydrogen Cyanide (AC) 50%, AsCl <sub>3</sub> 20%, SnCl <sub>4</sub> 5%, Chloroform 25%	JBR	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required.
Hydrogen cyanide (AC) 50%, AsCl <sub>3</sub> 30%, SnCl <sub>4</sub> 15%, Chloroform 5%	VN	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required.
Methyl Methanesulphonate	MS	Denatured Alcohol or Acetone	95% 100%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Agitate for 1 hour. Do not heat.
Tin Tetrachloride (Stannic Chloride)	KJ	Water	NA	85 (22.5) 188 lbs.	85 (22.5) 188 lbs.	85 (22.5) 188 lbs.	Dissolve in water. Agitate for 1 hour. Heat water to prevent freezing.
Lewisite	L	HPO <sub>2</sub> <sup>TM</sup>	100%	85 (22.5) 230 lbs.	110 (29) 230 lbs.		1. Heat supply tanks to 65°C. Add HPO <sub>2</sub> <sup>TM</sup> , heat containment vessel to 65°C, agitate for 6 hours. Drain.  2. Add 110 liters of water for hot water treatment, heat containment vessel to 100°C, and agitate 2 hours. Allow water to cool and drain.  3. Add 65 liters of ambient water to rinse and drain.



Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	Chemical Fill Quantity			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment	Volume and Weight of Reagent or Solvent Required for Treatment	Volume and Weight of Reagent or Solvent Required for Treatment	
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Mustard	H	MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	1. Heat supply tanks to 60°C. Add MEA reagent, heat containment vessel to 60°C, and agitate for 4 hours. Drain.  2. Add 80 liters of water for hot water treatment, heat containment vessel to 100°C, and agitate 2 hours. Allow water to cool and drain.  3. Add 65 liters of ambient water to rinse and drain.
Mustard – Distilled	HD	MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	
Mustard – Sulfur	HS	MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	
Mustard – 60% HD, 40% T	HT	MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	
Mustard (H) + Chlorobenzene		MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	
Mustard (H) + DA		MEA	90%	85 (22.5) 191 lbs.	85 (22.5) 191 lbs.	120 (32) 272 lbs.	
Mustard – Lewisite	HL	HPO <sub>2</sub> <sup>TM</sup>	100%	85 (22.5) 230 lbs.	110 (29) 230 lbs.		1. Heat supply tanks to 65°C. Add HPO <sub>2</sub> <sup>TM</sup> , heat containment vessel to 65°C, agitate for 6 hours. Drain.  2. Add 110 liters of water for hot water treatment, heat containment vessel to 100°C, and agitate 2 hours. Allow water to cool and drain.  3. Add 65 liters of ambient water to rinse and drain.
Phosgene	CG	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required. Add 65 liters of ambient water to rinse and drain.

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A. Chemical Fill Quantity			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment			
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Phosgene (CG), Diphenylchloroarsine (DA)	CG/DA	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required. May be called "PD" (military term). Be sure not to confuse it with the symbol for the chemical Phenyldichloroarsine.
Phenyldichloroarsine (PD)	PD	Denatured Alcohol	95%	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	85 (22.5) 148 lbs.	Sometimes PD is referred to as a CG and DA mixture. Agitate for 1 hour. Do not heat.
Phosgene (CG) 50%, AsCl <sub>3</sub> 50%	CBR	NaOH	20% aq	85 (22.5) 230 lbs.	133 (35) 357 lbs.	133 (35) 357 lbs.	Agitate for 1 hour. Heating not required.
Chlorosulfonic Acid		NaOH	20% aq	85 (22.5) 230 lbs.	85 (22.5) 230 lbs.	120 (32) 326 lbs.	Violent reaction when mixed with sodium hydroxide. Agitate for 1 hour. Heating not required.
Sulfur Trioxide/Chlorosulfonic Acid	FS	NaOH	20% aq	85 (22.5) 230 lbs.	85 (22.5) 230 lbs.	120 (32) 326 lbs.	Violent reaction when mixed with sodium hydroxide. Agitate for 1 hour. Heating not required.
Titanium Tetrachloride	FM	NaOH	20% aq	85 (22.5) 230 lbs.	85 (22.5) 230 lbs.	120 (32) 326 lbs.	Violent reaction when mixed with sodium hydroxide. Agitate for 1 hour. Heating not required.
White Phosphorous	WP	NaOH & H <sub>2</sub> O <sub>2</sub>	See Comments	See Comments	See Comments	See Comments	For WP less than 7 pounds, use 57 liters (15 gal.); 142 pounds, 35% H <sub>2</sub> O <sub>2</sub> and 82 liters (21 gal.); 214 pounds, 20% NaOH. Do not process WP with a weight greater than 7 pounds in the EDS. Agitate for 1 hour. Heating not required.

Table 3-1. Quantities of Reagent or Solvent Required for Treatment of Chemical Fill (Continued)

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A Chemical Fill Quantity of:			Comments
				Less than 5 lbs.	5 to 9 lbs.	> 9 but < 30 lbs.	
				Volume and Weight of Reagent or Solvent Required for Treatment:			
				Liters (Gal.) Weight	Liters (Gal.) Weight	Liters (Gal.) Weight	
Sarin	GB	MEA	45%	110 (29) 243 lbs.	110 (29) 243 lbs.	120 (32) 265 lbs.	1. Heat supply tanks to 60°C. Add MEA reagent. Heat containment vessel to 25°C. Agitate for 4 hours and drain.  2. Add 110 liters of water for hot water treatment. Heat containment vessel to 100°C. Agitate for 1 hour, allow to cool, and drain.  3. Add 65 liters ambient water to rinse. Agitate for 10 minutes and drain.
Soman	GD	MEA	45%	85 (22.5) 188 lbs.	85 (22.5) 188 lbs.	120 (32) 265 lbs.	
Tabun	GA	MEA	45%	85 (22.5) 188 lbs.	85 (22.5) 188 lbs.	120 (32) 265 lbs.	
	VX	MEA & NaOH	9 parts 90% MEA & 1 part 50% NaOH	85 (22.5) 196 lbs	85 (22.5) 196 lbs		1. Heat supply tanks to 60°C. Add MEA and NaOH reagent. Heat containment vessel to 60°C. Agitate for 6 hours and drain.  2. Add 110 liters of water for hot water treatment. Heat containment vessel to 100°C. Agitate for 2 hours, allow to cool, and drain.  3. Add 65 liters ambient water to rinse. Agitate for 10 minutes and drain.

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## PROCEDURE 4 PREPARE EDS FIRING SYSTEM

The purpose of this operation is to provide operating guidelines in preliminary function checks of the EDS Firing System.

### Note

**Alternate the use of the Firing Systems each time a detonation occurs. Alternating Firing Systems between sets A and B may prolong electronic component life.**

- 1.0 **PREPARE** appropriate EDS FIRING SYSTEM for preliminary functional checks as follows:
  - 1.1 **REMOVE** front cover and **SECURE** it to right side of FIRING SYSTEM CASE.

### Note

**There are two safety interlock plugs. One is in the possession of the Fireset Operator during operations and the other one is secured in the Command Post.**

- 1.2 **CONFIRM** Fireset Operator has possession and maintains control of the SAFETY INTERLOCK PLUG.
- 1.3 **ASSURE** TEST INTERFACE CHASSIS 24-volt direct current (VDC) POWER switch and all CONTROL MODULE switches are in OFF positions.
- 1.4 **ASSURE** HI-POTTER line POWER switch is OFF.

### Notes

**Spare parts and ancillary items are located in the accessories drawer.**

**Firing System front cover may be re-installed to protect internal components from inclement weather.**

- 1.5 When using the CONTROL MODULE remotely, **ASSURE** 29-inch internal control cable J29A connector is connected to FIRING SYSTEM CHASSIS J29B INPUT connector and its J3A connector is connected to the internal connector of the mating CONTROL connector located on the left side of the FIRING SYSTEM CASE.
- 1.6 **CONNECT** extension power cord from available 120-volt outlet to POWER receptacle on left side of FIRING SYSTEM CASE.
- 2.0 **PERFORM** function checks of EDS FIRING SYSTEM as follows:

**Note**

The control cable is comes in four different lengths (12-inch, 29-inch internal, 30-foot, and 300-foot). System function checks should be conducted with the same control cable(s) that will be used during munition detonation.

- 2.1 **CONNECT** appropriate length control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** opposite end to one of the following:
  - 2.1.1 External mating CONTROL connector located on the left side of FIRING SYSTEM CASE when CONTROL MODULE is used remotely.
  - 2.1.2 FIRING SYSTEM CHASSIS J29B INPUT connector (29-inch internal control cable J29A connector disconnected).
- 2.2 **INSERT** SAFETY INTERLOCK PLUG into INTERLOCK connector on TEST INTERFACE CHASSIS.
- 2.3 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON (amber ON-OFF light and INTERLOCK light illuminate).
- 2.4 **ASSURE** FIRING SYSTEM'S TRIGGER and CAPACITOR DISCHARGE UNIT (CDU) BITE indicator windows display black, not white (**TURN** BITE indicator dial gently clockwise until indicators display black).

- 2.5 **PRESS** and **HOLD** TEST button on CONTROL MODULE, and **OBSERVE** the following:
  - 2.5.1 **ASSURE** all lights illuminate with the READY light delayed approximately 1 second. **REPLACE** burned out light bulbs as needed and **RETEST**.
  - 2.5.2 **ASSURE** TRIGGER and CDU BITE indicators trip to white.
  - 2.5.3 **ASSURE** HIGH VOLTAGE meter illuminates and displays a reading of  $2.85 \pm .02$  volts.
- 2.6 **RELEASE** TEST button and **RESET** BITE indicators to black position.
- 2.7 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.

**WARNING**

**FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.**

- 2.8 **REMOVE** SAFETY INTERLOCK PLUG.
- 3.0 **PREPARE** to conduct continuity checks of FIRING SYSTEM as follows:
  - 3.1 **ASSURE** dust caps (blue-dot) are connected to any exposed ends of 50-foot detonator cables.
- 4.0 **CONNECT** EDS FIRING SYSTEM to CONTAINMENT VESSEL as follows:
  - 4.1 **ASSURE** four detonator cables (CH1 through CH4) located on the inside of the left-side panel of FIRING SYSTEM CASE are connected to the backside of the TEST INTERFACE CHASSIS (CH1 through CH4).
  - 4.2 **ASSURE** 4-foot detonator cables located inside the SHORTING connectors compartment are connected to connectors CH1 through CH4 at the rear of the compartment and to the SHORTING connectors on the front of SHORTING CONNECTORS PANEL.

- 4.3 **CONNECT** four 50-foot detonator cables to connectors (CH1 through CH4) located on the exterior of the left-side panel of FIRING SYSTEM CASE.

**Caution**

**Stepping on detonator cable may cause loss of electrical continuity due to cable damage.**

- 4.4 **ROUTE** four 50-foot detonator cables alongside of trailer to vicinity of open CONTAINMENT VESSEL door.
- 4.5 **CONNECT** INTERIOR SHORTING TEST JACK to high voltage feedthrough banana plugs on inside of HIGH VOLTAGE FLANGE.
- 4.6 **REMOVE** and **RETAIN** barrel connectors and dust caps (blue-dot caps) from 50-foot detonator cables.

**Note**

**Maintain numerical sequence of 50-foot detonator cables with numerical sequence of CDU module (CH1 through CH4). (See Figure 4-1.)**

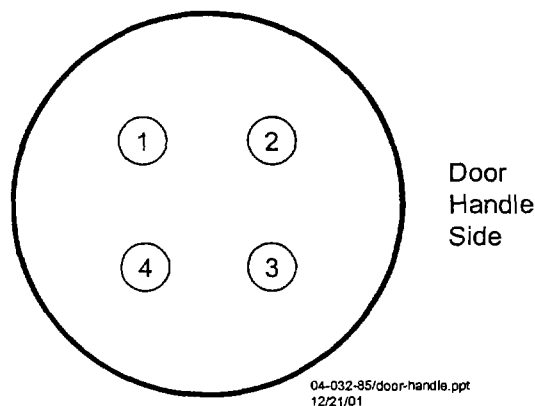


Figure 4-1. High Voltage Flange Exterior View

- 4.7 **ATTACH** four 50-foot detonator cables to EXTERIOR DETONATOR JACK in sequence (CH1 through CH4), as shown in Figure 4-1.



- 4.8 **INSTALL** EXTERIOR DETONATOR JACK to high voltage detonator feedthrough banana plugs located on HIGH VOLTAGE FLANGE exterior.
- 4.9 **TOGGLE** either of two LOAD CONTINUITY meter switches to ON.
- 4.10 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 5.0 **CONDUCT** continuity check of EDS FIRING SYSTEM as follows:
  - 5.1 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter on TEST INTERFACE CHASSIS.
  - 5.2 **DISCONNECT** 4-foot detonator cable from CH1 on SHORTING CONNECTORS PANEL and **CONNECT** to selected LOAD CONTINUITY connector located on TEST INTERFACE CHASSIS.

#### Notes

In the next step, acceptable meter display reading is no greater than 030 (30 milliohms [ $m\Omega$ ]).

If any detonator cable fails continuity test, check connections and internal 9-volt batteries, and retest. If detonator cable fails again, replace cable and retest. If test fails for the third time, request maintenance support.

- 5.3 **VERIFY** load continuity. **OBSERVE** LOAD CONTINUITY meter display for a reading no greater than 030 (30  $m\Omega$ ).
- 5.4 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY connector, and **CONNECT** to CH1 on SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
- 5.5 **REPEAT** Steps 5.2 through 5.4 for the remaining three detonating cables.
- 5.6 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 5.7 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 5.8 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.

- 6.0 **PREPARE** to conduct high potential (HI-POT) test on 50-foot detonator cables and high voltage feedthroughs as follows:

**WARNING**

**AN ELECTRICAL SHOCK HAZARD POTENTIAL EXISTS DURING FOLLOWING PROCEDURE. TRAILER MUST BE CLEARED OF ALL PERSONNEL AND CONTACT WITH EXPOSED METAL PARTS MUST BE AVOIDED. FAILURE TO COMPLY MAY RESULT IN PERSONNEL INJURY.**

- 6.1 **CONFIRM** that Fireset Operator has possession and maintains control of SAFETY INTERLOCK PLUG.
- 6.2 **REMOVE** INTERIOR SHORTING TEST JACK from high voltage feedthrough banana plugs on inside of HIGH VOLTAGE FLANGE.
- 6.3 **ASSURE** personnel are clear of trailer and detonator cables throughout remainder of HI-POT test.
- 7.0 **CONNECT** EDS FIRING SYSTEM to HI-POTTER INTERFACE CHASSIS as follows:
- 7.1 **INSERT** and **SECURE** SAFETY INTERLOCK PLUG into HI-POTTER INTERLOCK connector located on right side of HI-POTTER INTERFACE CHASSIS.
- 7.2 **TOGGLE** HI-POTTER LINE POWER switch to ON position and **OBSERVE** that LINE POWER switch light and green READY light illuminate.
- 7.3 **REMOVE** dust cap from HI-POTTER INTERFACE HIGH VOLTAGE connector.
- 7.4 If required, **PRESS** RESET button to return OUTPUT VOLTAGE display to 0.00 volts.
- 7.5 **DISCONNECT** CH1 4-foot detonator cable from SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS and **CONNECT** to HIGH VOLTAGE connector on HI-POTTER INTERFACE CHASSIS.

**WARNING**

**THE FOLLOWING STEP APPLIES DANGEROUS LEVELS OF ELECTRICITY [4,210 VOLTS] TO THE DETONATOR CABLE UNDER TEST. DO NOT REMOVE CONNECTION TO HI-POTTER OUTPUT PANEL BEFORE DIRECT CURRENT (DC) VOLTMETER RETURNS TO 0 AND HIGH VOLTAGE ON LIGHT STOPS FLASHING. FAILURE TO COMPLY MAY RESULT IN INJURY.**

**Note**

**In the following step, a faulty high voltage feedthrough conductor, exterior detonator jack, or detonator cable will cause an audible alarm to sound and the FAIL light to illuminate.**

**8.0 CONDUCT HI-POTTER test as follows:**

**8.1 PRESS and RELEASE START button on HI-POTTER INTERFACE CHASSIS to test CH1 detonator cable and OBSERVE for the following:**

- 8.1.1 DC voltmeter OUTPUT VOLTAGE increases to 4,210 volts and remains there for approximately 10 seconds.**
- 8.1.2 WATCH for high voltage ON light to begin to flash and then stop.**
- 8.1.3 PRESS RESET button to return OUTPUT VOLTAGE display to 0.00 volts.**
- 8.1.4 PROCEED as follows:**
  - 8.1.4.1 PROCEED to Step 8.2 after VOLTAGE OUTPUT displays 0.00 volts, high voltage ON light stops flashing, and there is no audible alarm.**
  - 8.1.4.2 PERFORM the following when audible alarm sounds and/or the high voltage ON light does not illuminate:**
    - 8.1.4.2.1 PERFORM Step 9.0 and then PROCEED to Step 8.1.4.2.2.**
    - 8.1.4.2.2 INSPECT all connections, and REPLACE faulty cable(s) or connection(s).**

8.1.4.2.3 **RETURN** to Step 7.2, and **RESUME** HI-POTTER test.

- 8.2 **DISCONNECT** CH1 detonator cable from HIGH VOLTAGE connector on HI-POTTER INTERFACE CHASSIS and **CONNECT** to SHORTING CONNECTORS PANEL (CH1) on TEST INTERFACE CHASSIS.
- 8.3 **REPEAT** Steps 7.5 through 8.2 for remaining detonator cables (CH2 through CH4) and then **PROCEED** to Step 9.0.
- 9.0 **SHUT DOWN** HI-POTTER INTERFACE CHASSIS as follows:
  - 9.1 **TOGGLE** HI-POTTER LINE POWER switch to OFF position, and **RE-INSTALL** dust cap.
  - 9.2 **REMOVE** SAFETY INTERLOCK PLUG from INTERLOCK connector on HI-POTTER INTERFACE CHASSIS.
- 10.0 **STOW** 50-foot detonator cables as follows:
  - 10.1 **DISCONNECT** EXTERIOR DETONATOR JACK from high voltage feedthrough banana plugs on outside of HIGH VOLTAGE FLANGE.
  - 10.2 **STOW** 50-foot detonator cables with attached EXTERIOR DETONATOR JACK in designated area.
  - 10.3 **INSTALL** EXTERIOR DETONATOR SHORTING JACK to high feedthrough banana plugs on outside of HIGH VOLTAGE FLANGE.

**CALLOUT:** Announce time HI-POTTER test completed.

- 11.0 **RECORD** HI-POTTER test is complete.

**Caution**

A Dry Run Load Test should be performed upon initial arrival at a worksite or after maintenance on CDU module. Excessive testing of CDU module may cause unnecessary wear on CDU module components.

- 12.0 **PERFORM** one of the following:
  - 12.1 **PROCEED** to Procedure 5 if Dry Run Load Test is not necessary.

- 12.2 **PROCEED** to Step 13.0 if Dry Run Load Test was not completed upon arrival or if FIRING SYSTEM CHASSIS has been replaced.

**Note**

The control cable comes in four different lengths (12-inch, 29-inch internal, 30-foot, and 300-foot). Dry Run Load Test should be conducted with the same control cable(s) that will be used during munition detonation.

- 13.0 **PERFORM** Dry Run Load Test of EDS FIRING SYSTEM CHASSIS as follows:
- 13.1 **CONNECT** appropriate length control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** opposite end to one of the following:
    - 13.1.1 External mating CONTROL connector located on the left side of FIRING SYSTEM CASE when CONTROL MODULE is used remotely.
    - 13.1.2 FIRING SYSTEM CHASSIS J29B INPUT connector (29-inch internal control cable J29A connector disconnected).
  - 13.2 **CONNECT** LOAD MODULE test cable to any channel (CH1 through CH4) on CDU MODULE.
  - 13.3 **INSERT** SAFETY INTERLOCK PLUG into INTERLOCK connector on TEST INTERFACE CHASSIS.
  - 13.4 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
  - 13.5 **ASSURE** TRIGGER and CDU BITE indicators are set to black position (**TURN** BITE indicator dial gently clockwise until indicators are set to black).
  - 13.6 **TOGGLE** CONTROL MODULE POWER switch to ON. **OBSERVE** red light-emitting diode HIGH VOLTAGE meter and green POWER light illuminate.
  - 13.7 **TOGGLE** CONTROL MODULE ARM switch to ON, and **OBSERVE** that amber READY light and red ARM light illuminate.

**WARNING**

**THE FOLLOWING STEP APPLIES DANGEROUS LEVELS OF ELECTRICITY (up to 3.1 KILOVOLTS) TO THE DETONATOR CABLES UNDER TEST. DO NOT DISCONNECT CABLES WHILE SYSTEM IS ARMED. FAILURE TO COMPLY MAY RESULT IN INJURY.**

- 13.8 To fire, **TOGGLE UP** and **RELEASE** CONTROL MODULE FIRE switch and **OBSERVE** for the following:
  - 13.8.1 Amber READY light should momentarily flash OFF and then ON.
  - 13.8.2 Blue FIRE light illuminates.
  - 13.8.3 TRIGGER and CDU BITE indicators trip to white.
- 13.9 **CLOSE** cover on FIRE and ARM switches.
- 13.10 **VERIFY** that voltage on HIGH VOLTAGE meter achieves 0 volts.
- 13.11 **TOGGLE** CONTROL MODULE POWER switch to OFF.
- 13.12 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.

**WARNING**

**FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.**

- 13.13 **REMOVE** SAFETY INTERLOCK PLUG from INTERLOCK connector on TEST INTERFACE CHASSIS.
- 13.14 **DISCONNECT** LOAD MODULE test cable from selected channel on CDU MODULE.

13.15 **STOW** LOAD MODULE in FIRING SYSTEM accessories drawer.

**CALLOUT:** Announce time Dry Run Load Test completed.

14.0 **PROCEED** to Procedure 5.

SPECIAL REQUIREMENTS:

None.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
EDS operator log	1 each
50-foot detonator cable	4 each
4-foot detonator cable	4 each
300-foot control cable	1 each
30-foot control cable	1 each
12-inch control cable	1 each
29-inch internal control cable	1 each
Dust cap (blue-dot)	8 each
Exterior detonator jack	1 each
Exterior detonator shorting jack	1 each
Exterior ground rod base	1 each
Safety interlock plug	2 each
High voltage feedthrough assembly	4 each
Interior ground rod/spider assembly	1 each
Interior detonator jack	as required
Interior shorting test jack	1 each
Interior detonator shorting plug	3 each
Duct tape	1 roll
Indelible ink pen	1 each
50-foot extension cord	1 each
Firing System	2 each

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**PROCEDURE 5  
SELECT FRAGMENT SUPPRESSION SYSTEM  
AND EXPLOSIVES FOR MUNITION**

The purpose of this procedure is to secure loading table in front of containment vessel opening and to allow pre-positioning of FSS and explosives prior to loading munition.

- 1.0 **ASSURE** metal seal is in place.
- 2.0 **SECURE** loading table to grating as follows:

**WARNING**

**LOADING TABLE WEIGHS APPROXIMATELY 70 POUNDS AND IS CUMBERSOME TO HANDLE. USE TWO OPERATORS WHEN LIFTING AND POSITIONING TABLE. FAILURE TO COMPLY MAY RESULT IN INJURY.**

- 2.1 **POSITION** LOADING TABLE (Teflon® bumper toward CONTAINMENT VESSEL) in front of CONTAINMENT VESSEL with CONTAINMENT VESSEL door open.
- 2.2 **TURN** adjusting handles counterclockwise to lower T-clamps attached to LOADING TABLE through floor grating.
- 2.3 **POSITION** T-clamps to catch under bar of grating.
- 2.4 **SECURE** clamps by pulling up T-clamp handles, and **TIGHTEN** jam nut as necessary.
- 3.0 **SELECT** appropriate FSS assembly as follows:
  - 3.1 **PROCEED** to Annex E for old style FSS.
  - 3.2 **PROCEED** to Step 4.0 for new style FSS.

4.0 **PRE-POSITION** cylinder top and frame/cylinder bottom assembly and explosives as follows:

**Notes**

**For munition types not listed in the following note, consultation with Sandia National Laboratories explosive engineers is required for proper FSS selection and/or modification.**

**The new style EDS FSS comes in two sizes and requires five similar, but specific, munition holders. The munition holders vary in size and/or shape to accommodate the following:**

- a. 75mm shell (Procedure 7, Figure 7-1)
- b. Livens projectile (Procedure 7, Figure 7-2)
- c. 4.2-inch mortar (Procedure 7, Figure 7-3)
- d. Typical munition (Procedure 7, Figure 7-4)
- e. M139 bomblet (Procedure 7, Figure 7-5).

- 4.1 **OBTAIN** FSS assembly and explosive charges for munition to be treated.
- 4.2 **REMOVE** FSS assembly from shipping container.
- 4.3 **CHECK** serviceability and **ASSURE** completeness of FSS assembly as follows:
  - 4.3.1 Cylinder bottom securely attached to frame at four locations.
  - 4.3.2 Stopper block captured by frame tabs and positioned between frame and cylinder bottom.
  - 4.3.3 Munition holder positioned in cylinder bottom with munition holder tabs (one short, one long) for indexing munition in place.
  - 4.3.4 Roll pins in four corners of cylinder bottom.
  - 4.3.5 Cylinder top.
  - 4.3.6 Endplates (front and back) of appropriate size.
  - 4.3.7 Optional strain relief clips (binder clips).

**Note**

**Generally, the aft end of frame/cylinder bottom assembly is positioned facing the rear end of containment vessel and the forward end is positioned facing containment vessel door end.**

- 4.4 **POSITION** frame/cylinder bottom assembly on LOADING TABLE so that munition holder tabs (long end for 75mm shell and 4.2-inch mortar, short end for Livens projectile) are facing rear of containment vessel.
- 4.5 **CHECK** serviceability and **ASSURE** completeness of FSS explosive items as follows:
  - 4.5.1 Linear-shaped charge (LSC).
  - 4.5.2 LSC detonator assemblies, two each, RP-1.

**Note**

**M139 bomblet FSS requires only one conical-shaped charge (CSC).**

- 4.5.3 CSCs, two each, fitted with O-rings.
  - 4.5.4 CSC detonator assemblies, two each, RP-2.
  - 4.5.5 **INSPECT** detonators, CSCs, and LSC. **REPLACE** damaged component(s) from expendable supplies.
  - 4.5.6 **PLACE** O-ring onto nipple of both CSCs, if necessary.
  - 4.5.7 **PLACE** items back into shipping container until final FSS assembly.
- 4.6 **POSITION** cylinder top next to LOADING TABLE.

**SPECIAL REQUIREMENTS:**

None.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
EDS operator log	1 each
Indelible ink pen	1 each
Loading table	1 each
Primary tool kit	1 each
FSS	1 each per munition
Cylinder top	1 each
Frame/cylinder bottom assembly consisting of:	
- Frame	1 each
- Stopper block	1 each
- Cylinder bottom	1 each
- Munition holder	1 each
CSCs with O-rings	2 each
LSC	1 each
Strain relief clips (large binder clips)	4 each
LSC detonator clips	2 each
CSC detonator clips	2 each
Endplates (front and rear)	2 or 4 each
Exploding bridge wire detonator, RP-1	2 each
Exploding bridge wire detonator, RP-2	2 each
Interior detonator jack	1 each
Interior detonator shorting plug	1 each
Duct tape	1 roll

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## PROCEDURE 6 TRANSFER MUNITION

The purpose of this procedure is to provide operating guidelines for the custody transfer of the munition being processed in the EDS.

### PRECONDITIONS:

1. Munition has been previously assessed by the Materiel Assessment Review Board (MARB).
2. EDS must be set up and ready to receive a munition for processing.
3. PDS must be available.
4. Air monitoring must be operational.
5. Pre-operations checklist must be completed.

#### 1.0 **CLEAR** area.

- 1.1 **ARRANGE** for security personnel to exclude all non-essential personnel from the EDS site (Figure 1-1).

**CALLOUT:** Obtain authorization for munition to be delivered to the EDS site.

### **WARNING**

**IF MUNITION IS NOT OVERPACKED, DON PPE IAW STEPS 3.0 THROUGH 3.2 AND THEN RETURN TO STEP 2.0.**

- 2.0 **VERIFY** receipt of munition on DD Form 1911, Materiel Courier Receipt (Annex A, Figure A-3).

- 2.1 **COMPARE** the munition container serial number or other inventory control marking against the Materiel Courier Receipt.

**CALLOUT:** Announce munition identification number and assure Monitoring is aware of number.

- 2.2 **COMPLETE** and **SIGN** Materiel Courier Receipt.
- 2.3 **TAKE** custody of the munition item, and **RECORD** serial number and time.

**CALLOUT:** Announce time transfer completed.

- 3.0 **DON** PPE.
  - 3.1 **DON** appropriate PPE IAW the EDS HASP and/or at the direction of the Site Safety and Health Officer (SSHO).
  - 3.2 **PROCEED** to PDS for PPE checkout by PDS operators.
- 4.0 **PROCEED** to Step 4.1 for an overpacked munition or to Step 6.0 for an unpacked munition.

**WARNING**

**EXTREME CARE MUST BE USED WHEN HANDLING AN ARMED MUNITION. UNDUE MOVEMENT OR ROUGH HANDLING MAY CAUSE THE MUNITION TO DETONATE.**

- 4.1 **EXAMINE** the exterior of the munition overpack for leaks and structural damage that may indicate damage to the overpack's contents.

**WARNING**

**WHEN MUNITION IS TOO HEAVY FOR ONE PERSON TO HAND CARRY, USE TWO OPERATORS OR A HAND TRUCK. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

- 4.2 **MOVE** the munition overpack to the hazardous waste catch tray.

5.0 **UNPACK** munition from overpack as follows:

- 5.1 **PLACE** overpack into a hazardous waste catch tray and **PLACE** spill pillows or other cushioning material into hazardous waste catch tray.
- 5.2 **REMOVE** overpack lid over catch tray.
- 5.3 **PLACE** the overpack lid in a solids hazardous waste drum.
- 5.4 **CLOSE** the solids hazardous waste drum.
- 5.5 **SLIDE** munition out of overpack onto spill pillow in the hazardous waste catch tray to minimize impact.
- 5.6 **OPEN** the solids hazardous waste drum and **PLACE** the overpack and packing material into it.
- 5.7 **CLOSE** the solids hazardous waste drum.
- 5.8 **CONDUCT** a visual inspection of plastic-wrapped munition for leaks or patches. **PERFORM** one of the following:
  - 5.8.1 **DO NOT REMOVE** a leaking munition from the plastic bag. **PROCEED** to Step 6.0.
  - 5.8.2 **REMOVE** non-leaking munition from the plastic bag, if necessary. **PROCEED** to Step 5.9 if there is no apparent leakage.
- 5.9 **OPEN** the solids hazardous waste drum and **PLACE** plastic bag into it.
- 5.10 **CLOSE** the solids hazardous waste drum.

**Caution**

**Extreme damage to EDS vessel may result if an attempt is made to treat a high explosive loaded munition.**

**Note**

**All EDS operators must be alert to detect any non-chemical munitions received at the EDS during routine EDS operations.**

6.0 **RECOGNIZE** any unsafe or non-chemical munition received at the EDS by the following:

6.1 **EVALUATE** and **RECORD** fuze and fuze condition.

6.1.1 **REVIEW** fuze X-rays, if available.

6.1.2 Positively **IDENTIFY** fuze, if possible.

6.1.3 **DETERMINE** fuze condition.

6.1.3.1 **DECLARE** fuze is safe (unarmed or safe to handle) and then **PROCEED** to Step 6.2.

6.1.3.2 **DECLARE** fuze unsafe, and **PROCEED** to Step 10.0.

6.2 **EVALUATE** and **RECORD** munition information as follows:

6.2.1 **INSPECT** munition for key identification features attributable to high explosive munitions (that is, welded base plate, absence of burster adapter, color-coding, permanent markings).

**CALLOUT:** Describe munition configuration (that is, bagged/unbagged, fuze wrapped with plaster of Paris, munition leak sealed, level of deterioration, overpacked/not overpacked) and obtain photographs.

6.2.2 **REVIEW** munition X-rays, if available.

6.2.3 **DETERMINE** munition type and **PERFORM** one of the following:

6.2.3.1 **DECLARE** munition chemical. **ATTEMPT** to identify chemical fill by physical identification features for munitions with inconclusive or no PINS data. **RECORD** munition type, and **PROCEED** to Step 6.2.4.

6.2.3.2 **DECLARE** munition non-chemical, **RECORD** munition type, and **PROCEED** to Step 10.0.

6.2.4 **INSPECT** munition for leakage or patches, and **RECORD** information.

6.2.4.1 **PROCEED** to Step 8.0 when no leakage is detected.

6.2.4.2 Immediately **PERFORM** the following when munition is leaking:

6.2.4.2.1 **NOTIFY** EDS Crew Supervisor about leaking munition.



6.2.4.2.2 **ATTEMPT** to positively identify agent fill, and **PERFORM** one of the following:

6.2.4.2.2.1 **NOTIFY** EDS Crew Supervisor identified chemical agent fill agrees with PINS data.  
**PROCEED** to Step 6.2.4.2.3.

6.2.4.2.2.2 **NOTIFY** EDS Crew Supervisor identified chemical agent fill does not agree with PINS data.  
**PERFORM** Steps 6.2.4.2.3 through 6.2.4.2.7 and then  
**PROCEED** to Step 10.0.

6.2.4.2.3 **WIPE** the area around the leak with 5 percent household bleach solution.

6.2.4.2.4 **SEAL** the leak with a plaster-of-Paris bandage or other suitable material.

6.2.4.2.5 **WAIT** the required sealant curing time (retain small piece of bandage/portion of mix and allow to cure).

6.2.4.2.6 **DECONTAMINATE** the munition body with 5 percent household bleach solution.

6.2.4.2.7 **RINSE** the munition body with water.

7.0 **DECONTAMINATE** the immediate work area, if necessary.

**CALLOUT:** Obtain permission to load munition into FSS.

8.0 **HAND CARRY** the munition to LOADING TABLE on EDS Trailer.

9.0 **PROCEED** to Procedure 7.

**UNUSUAL PROCEDURE:**

10.0 **PERFORM** the following steps for a suspected unsafe or non-chemical munition:

10.1 **REQUEST** assistance from the nearest Technical Escort Unit EOD team.

10.2 **CEASE** operations and clear area of non-essential personnel.

10.3 **WAIT** for EOD response team to arrive.

- 11.0 If necessary, **RECOMMEND** convening MARB to re-assess the suspect munition, and **WAIT** for MARB recommendation.
- 12.0 **PROCESS** munition IAW MARB recommendation as follows:
  - 12.1 **TRANSFER** munition to responding EOD team for final disposition when munition is determined to be non-chemical-filled.
  - 12.2 **DISPOSE** of hazardous chemical munition as follows:
    - 12.2.1 **PROCEED** to Procedure 7 when munition falls within net explosive weight of EDS.
    - 12.2.2 **RETURN** munition to original owning organization for final disposition when munition and EDS explosives exceed net explosive weight of EDS.
- 13.0 **RECORD** the following in EDS operations logbook:
  - 13.1 **DESCRIBE** procedure that led to the discovery of the suspected unsafe or non-chemical munition.
  - 13.2 **PROVIDE** an initial description of suspect munition and what it was contained in or how it was overpacked.
  - 13.3 **LIST** all actions taken regarding incident and final disposition of munition.
- 14.0 **RETURN** to Step 1.0, and **PREPARE** to receive the next munition.

**SPECIAL REQUIREMENTS:**

- 1. PPE must be worn IAW the HASP, if applicable.
- 2. MARB identification records must be available to the EOD Team Leader.
- 3. The EDS operations area must be evacuated.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

QUANTITY:

PPE IAW the HASP	1 per EDS crew member
Loading table	1 each
Hand truck	1 each
DD Form 1911, Material Courier Receipt	1 per item
Indelible ink pen	1 each
EDS operator log	1 each
Primary tool kit	1 each
Solid waste containers	1 each
Plaster of Paris bandages	2 per item
Water	5 gallons
Rags or paper towels	as required
Spill pillows	2 each
Household bleach solution (5 percent)	4 gallons
Digital camera	1 each
Hazardous waste catch tray	1 each

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## **PROCEDURE 7**

### **ASSEMBLY OF FRAGMENT SUPPRESSION SYSTEM AND MUNITION**

The purpose of this operation is to provide operating procedures for the final assembly of the FSS with a munition and placement of explosives prior to and during the loading of the FSS in the EDS containment vessel.

#### **PRECONDITIONS:**

1. EDS must be set up and ready to receive a munition for processing.
2. PDS must be available.
3. Air monitoring must be operational.
4. Firing System must be operational.
5. Fireset Operator must have possession of the safety interlock plug.
6. Interior detonator jack must have four detonator cable assemblies attached to it.

#### **1.0 SELECT and ASSEMBLE appropriate FSS as follows:**

- 1.1 **PROCEED** to Annex E to assemble old style FSS and munition.
- 1.2 **PROCEED** to Step 2.0 to assemble new style FSS and munition.

#### **2.0 ASSEMBLE new style FSS by munition type as follows:**

#### **Note**

**For munition types not listed below, consult with Sandia National Laboratories explosive engineers for proper FSS selection and/or modification.**

- 2.1 **PROCEED** to Step 3.0 for a 75mm shell.
- 2.2 **PROCEED** to Step 4.0 for a Livens projectile.
- 2.3 **PROCEED** to Step 5.0 for 4.2-inch mortar.
- 2.4 **PROCEED** to Step 6.0 for other types of munitions.
- 2.5 **PROCEED** to Step 7.0 for a M139 bomblet.

- 3.0 **PERFORM** the following steps to load the 75mm shell into the FSS:
- 3.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
- 3.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 3.3. If not, **PERFORM** the following:
- 3.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

**Notes**

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 3.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.
- 3.3 **PLACE** 75mm shell onto munition holder so it rests securely in holder with aft end of munition toward the aft end of holder. Long holder tab at aft end provides exact positioning for LSC. Tapered end of munition will be coincident with the short holder tab (Figure 7-1).

**Note**

**Tape may be used to hold LSC in place.**

- 3.4 **POSITION** LSC so it extends along the centerline of the munition with the open ends pointed toward nose and resting in munition holder.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 3.5 **SECURE** RP-1 detonators to each end of LSC by sliding a detonator clip on each end of LSC.

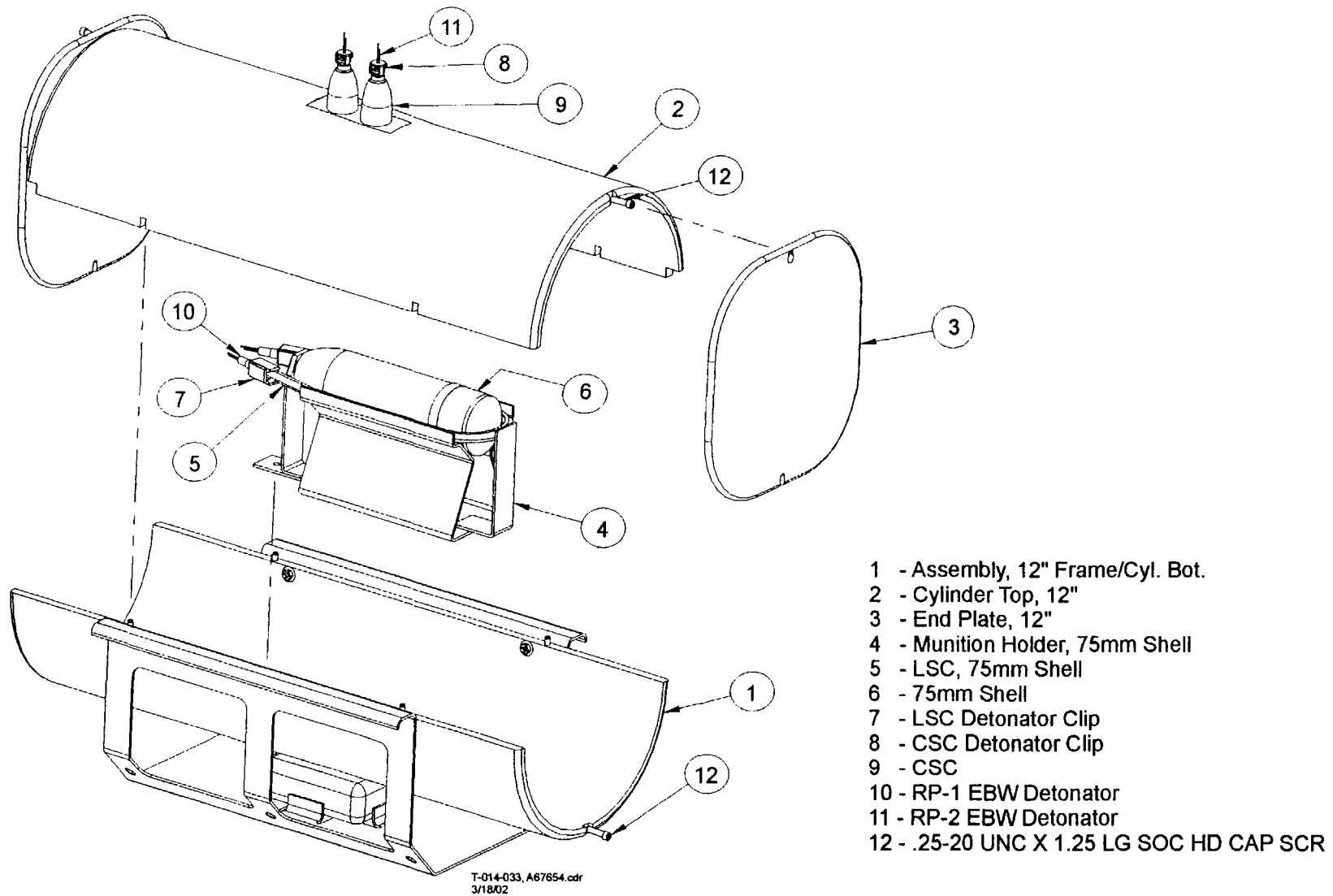


Figure 7-1. 75mm Shell FSS

- 3.6 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in cylinder top.

**CALLOUT:** Obtain photographs, if possible.

- 3.7 **LOWER** cylinder top onto cylinder bottom with CSC holes toward nose end of munition.
- 3.8 **ASSURE** that two cylinder halves align along entire seam.
- 3.9 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.
- 3.10 **SUSPEND** rear endplate(s) onto assembled FSS. **TIGHTEN** bolts finger-tight.
- 3.11 **PLACE** O-ring onto nipple of each CSC, if necessary.
- 3.12 **ATTACH** an RP-2 detonator assembly clip to each CSC. **SECURE** with tape, as needed.
- 3.13 **PUSH** CSCs into holes in cylinder top until seated firmly against machined surface.
- 3.14 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
- 3.15 If desired, **COIL** detonator wires and **ATTACH** strain relief clips to frame, if necessary.
- 3.16 **INSPECT** the munition and explosive components for proper configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
- 3.17 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.
- 3.18 **PROCEED** to Step 8.0.
- 4.0 **PERFORM** the following steps to load the Livens projectile in the FSS:

**Note**

**Tape may be used to hold LSC in place.**

- 4.1 **POSITION** LSC on munition holder with overlapped detonator ends pointed outward next to long end of two munition holder tabs (Figure 7-2).



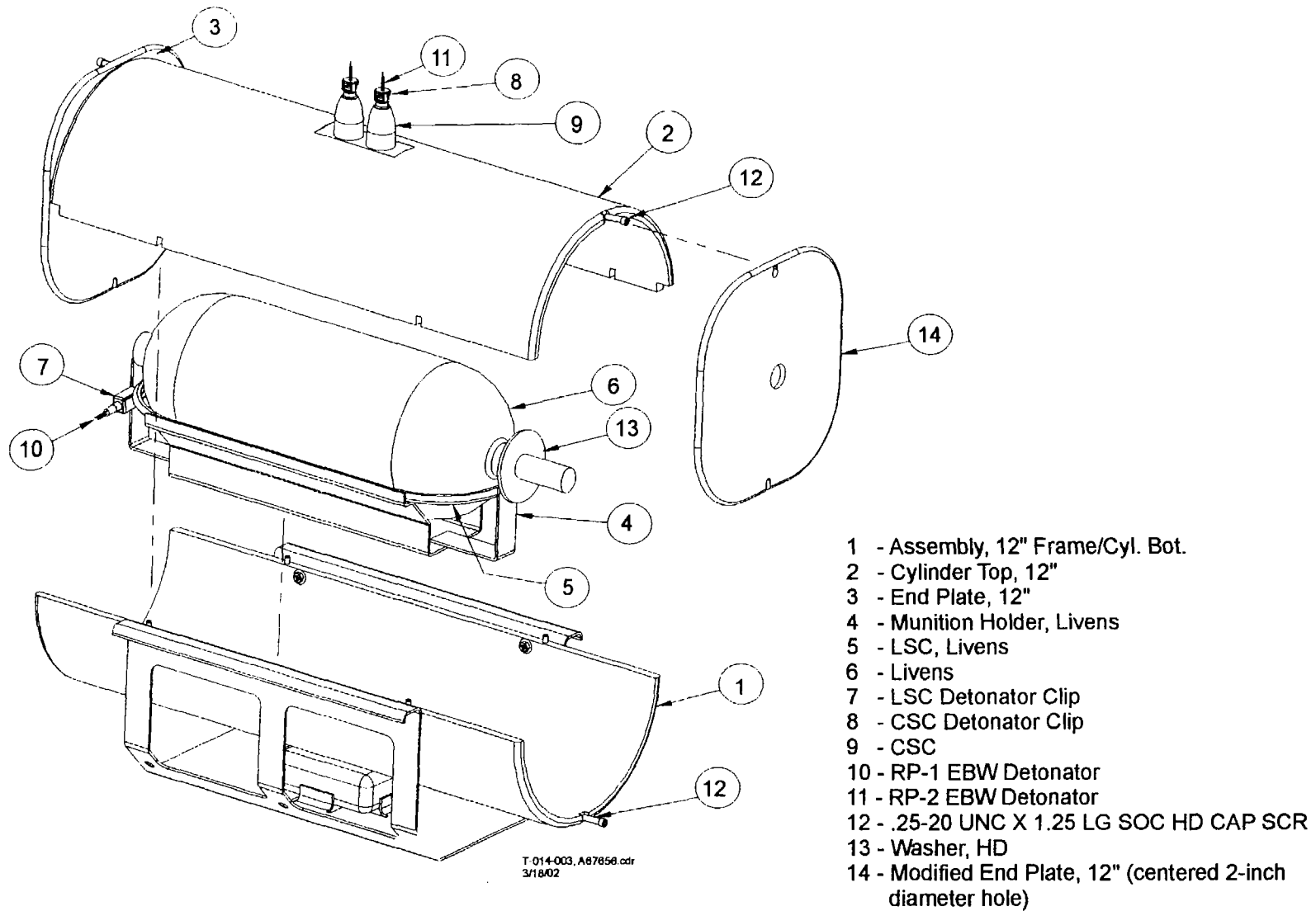


Figure 7-2. Livens Projectile FSS

- 4.2 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
- 4.3 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 4.4. If not, **PERFORM** the following:
  - 4.3.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

**Notes**

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 4.3.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 4.4 **SECURE** RP-1 detonators to each end of LSC by sliding a detonator clip onto each end of LSC.
- 4.5 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in the cylinder top.

**Note**

**Munition holder tabs provide exact positioning.**

- 4.6 **PLACE** Livens projectile onto munition holder so it rests securely in holder with nose end facing rear of vessel.

**CALLOUT:** Obtain photographs, if possible.

- 4.7 **LOWER** cylinder top onto cylinder bottom and **ASSURE** the two cylinder halves align along the entire seam.
- 4.8 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.
- 4.9 **SUSPEND** rear endplate(s) onto assembled FSS. **TIGHTEN** bolts finger-tight.
- 4.10 **PLACE** O-ring onto nipple of each CSC, if necessary.
- 4.11 **ATTACH** an RP-2 detonator assembly clip to each CSC.
- 4.12 **PUSH** CSCs into holes in cylinder top until seated firmly against machined surface. **SECURE** with tape as needed.
- 4.13 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
- 4.14 If desired, **COIL** detonator wires and **ATTACH** strain relief clips to frame, if necessary.
- 4.15 **INSPECT** munition and explosive components for configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
- 4.16 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.
- 4.17 **PROCEED** to Step 8.0.
- 5.0 **PERFORM** the following steps to load 4.2-inch mortar into the FSS:
  - 5.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 5.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 5.3. If not, **PERFORM** the following:
    - 5.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

**Notes**

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

5.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.

5.3 **PLACE** 4.2-inch mortar onto munition holder so it rests securely in holder with aft end of munition flush with end of holder. Munition holder tab at aft end provides exact positioning for LSC. Tapered end of munition will be coincident with short holder tab (Figure 7-3).

**Note**

**Tape may be used to hold LSC in place.**

5.4 **POSITION** LSC so it extends along the centerline of the munition with open ends pointed toward nose and resting in munition holder.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

5.5 **SECURE** RP-1 detonator to each end of LSC by sliding a detonator clip on each end of LSC.

5.6 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in the cylinder top.

**CALLOUT: Obtain photographs, if possible.**

5.7 **LOWER** cylinder top onto cylinder bottom with CSC holes toward nose end of munition.

5.8 **ASSURE** that two cylinder halves align along entire seam.

5.9 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.

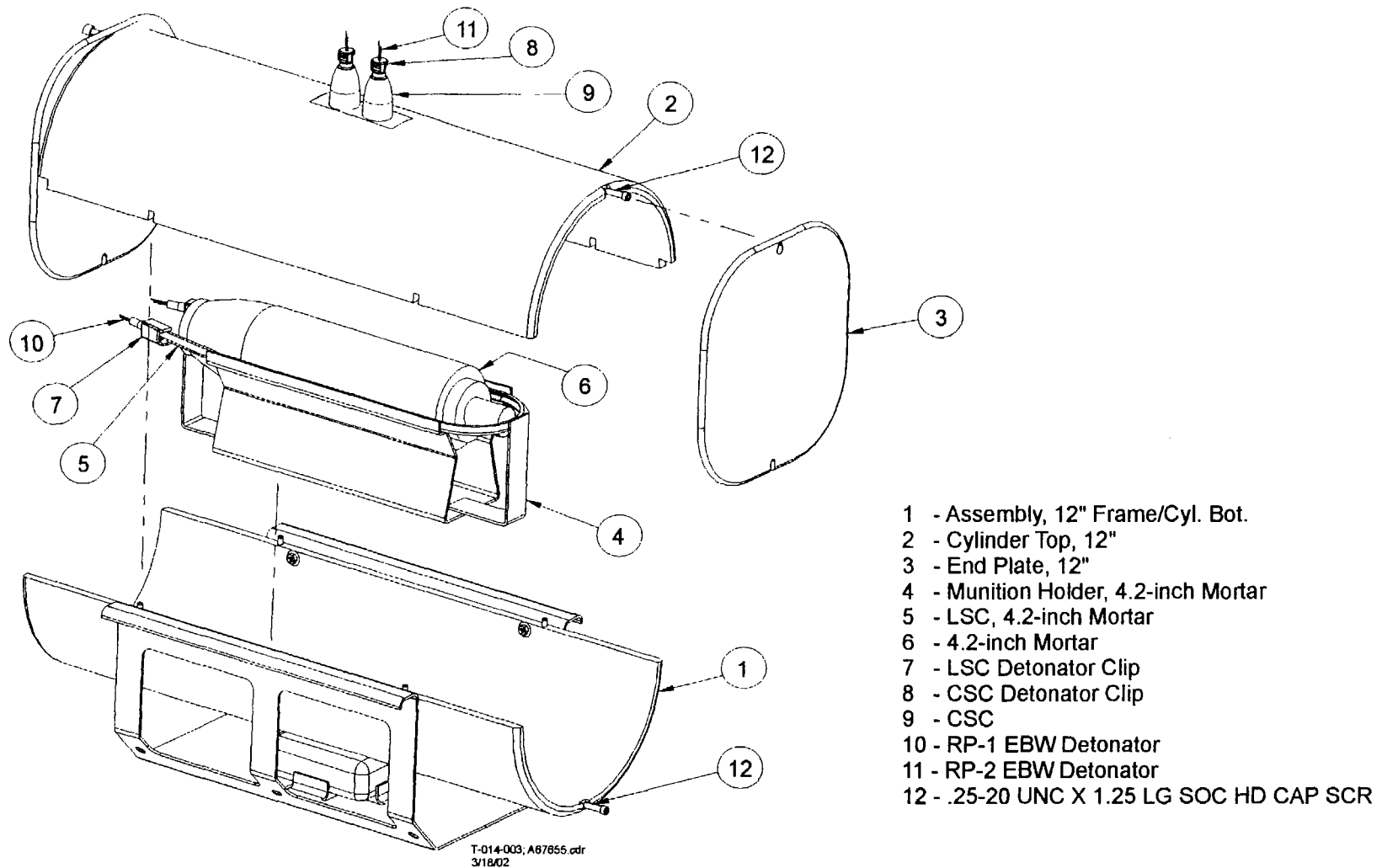


Figure 7-3. 4.2-inch Mortar FSS

- 5.10 **SUSPEND** rear endplate(s) onto assembled FSS. **TIGHTEN** bolts finger-tight.
  - 5.11 **PLACE** O-ring onto nipple of each CSC, if necessary.
  - 5.12 **ATTACH** an RP-2 detonator assembly clip to each CSC.
  - 5.13 **PUSH** CSCs into cylinder top until seated firmly against machined surface. **SECURE** with tape, as needed.
  - 5.14 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
  - 5.15 **INSPECT** munition and explosive components for configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
  - 5.16 **ASSURE** all detonator wires remain free from pinching with front endplate temporarily positioned.
  - 5.17 If desired, **COIL** detonator wires and **ATTACH** strain relief clips to frame, if necessary.
  - 5.18 **PROCEED** to Step 8.0.
- 6.0 **PERFORM** the following steps to load a typical munition into the FSS:
- 6.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 6.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 6.3. If not, **PERFORM** the following:
    - 6.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

### Notes

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 6.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.
- 6.3 **DETERMINE** location of the munition burster using available resources (that is, X-rays, publications, photographs, etc.).
- 6.4 **PLACE** munition onto munition holder so it rests securely in holder with aft end of munition facing toward rear of CONTAINMENT VESSEL (Figure 7-4).
- 6.5 **ASSURE** munition is stable and will not shift on munition holder. If necessary, **BEND** munition holder tabs to accommodate proper munition alignment.

**Note**

**Tape may be used to hold LSC in place.**

- 6.6 **POSITION** LSC so it extends along the centerline of the munition with open ends pointed toward nose and resting in munition holder.
- 6.7 **CHECK** LSC standoff as follows:
  - 6.7.1 **VERIFY** the standoff from the LSC to the munition is evenly spaced along the entire length of the munition.
  - 6.7.2 **REMOVE** the LSC, if necessary, and **BEND** or **FORM** the LSC to fit acceptably.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 6.8 **SECURE** RP-1 detonators to each end of LSC by sliding a detonator clip on each end of LSC.
- 6.9 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in the cylinder top.

**CALLOUT:** Obtain photographs.

- 6.10 **LOWER** cylinder top onto cylinder bottom with CSC holes toward nose end of munition.

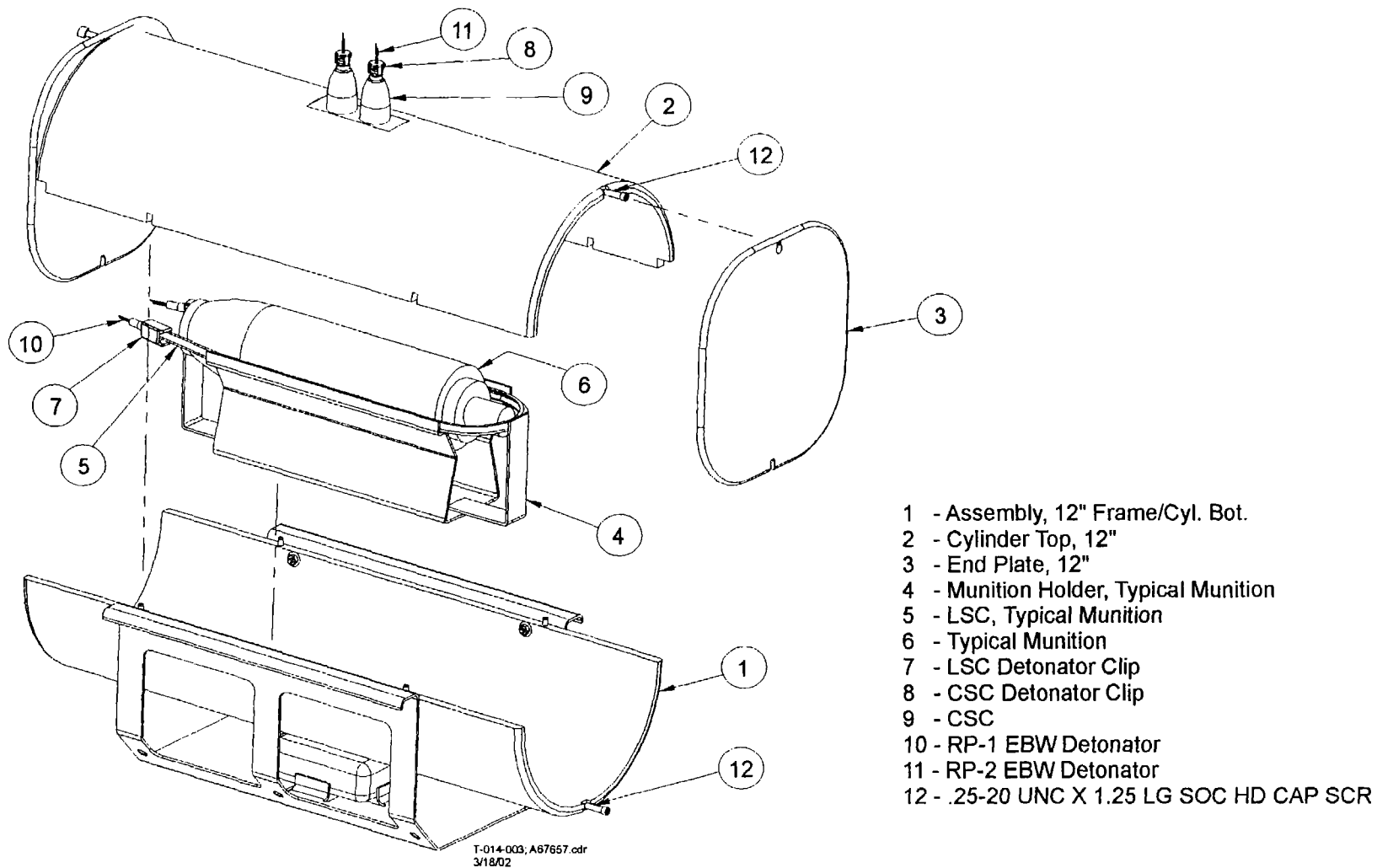


Figure 7-4. Typical Munition FSS



- 6.11 **ASSURE** that two half-cylinders align along entire seam.
- 6.12 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.
- 6.13 **SUSPEND** rear endplate(s) onto assembled FSS. **TIGHTEN** bolts finger-tight.
- 6.14 **PLACE** O-ring onto nipple of each CSC, if necessary.
- 6.15 **ATTACH** RP-2 detonator assembly clip(s) onto each CSC installed.
- 6.16 **PUSH** CSC(s) into hole(s) in cylinder top until seated firmly against machined surface. **SECURE** with tape, as needed.
- 6.17 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
- 6.18 If desired, **COIL** detonator wires and **ATTACH** strain relief clips to frame, if necessary.
- 6.19 **INSPECT** munition and explosive components for proper configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
- 6.20 **ASSURE** all detonator wires remain free from pinching with front endplate temporarily positioned.
- 6.21 **PROCEED** to Step 8.0.
- 7.0 **PERFORM** the following steps to assemble the M139 bomblet FSS:
  - 7.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 7.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 7.3. If not, **PERFORM** the following:
    - 7.2.1 **REMOVE** RP-1 detonator assemblies and RP-2 detonator assembly from shipping container.

**Notes**

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 7.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.
- 7.3 **VERIFY** all FSS parts are accessible, and **CHECK** all parts for serviceability.
- 7.4 **VERIFY** M139 bomblet holder base is secured to cylinder bottom (Figure 7-5).
- 7.5 **POSITION** LSC in M139 bomblet holder base with open ends pointed toward the M139 sliding munition holder.
- 7.6 **SECURE** LSC using pre-fabricated clip or tape, as appropriate.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 7.7 **SECURE** RP-1 detonators to each end of LSC by sliding detonator clip on each end of LSC.
- 7.8 **COIL** and **CLIP** LSC detonator wires to front end of cylinder bottom so as not to hinder movement of bomblet sliding munition holder.

**Note**

**Orientation of cylinder top should allow for access to the front-most point of the two center holes for upcoming CSC placement. Plug unused CSC hole to avoid possible confusion.**

- 7.9 **LOWER** cylinder top onto cylinder bottom.
- 7.10 **VERIFY** that two half-cylinders align along entire seam.

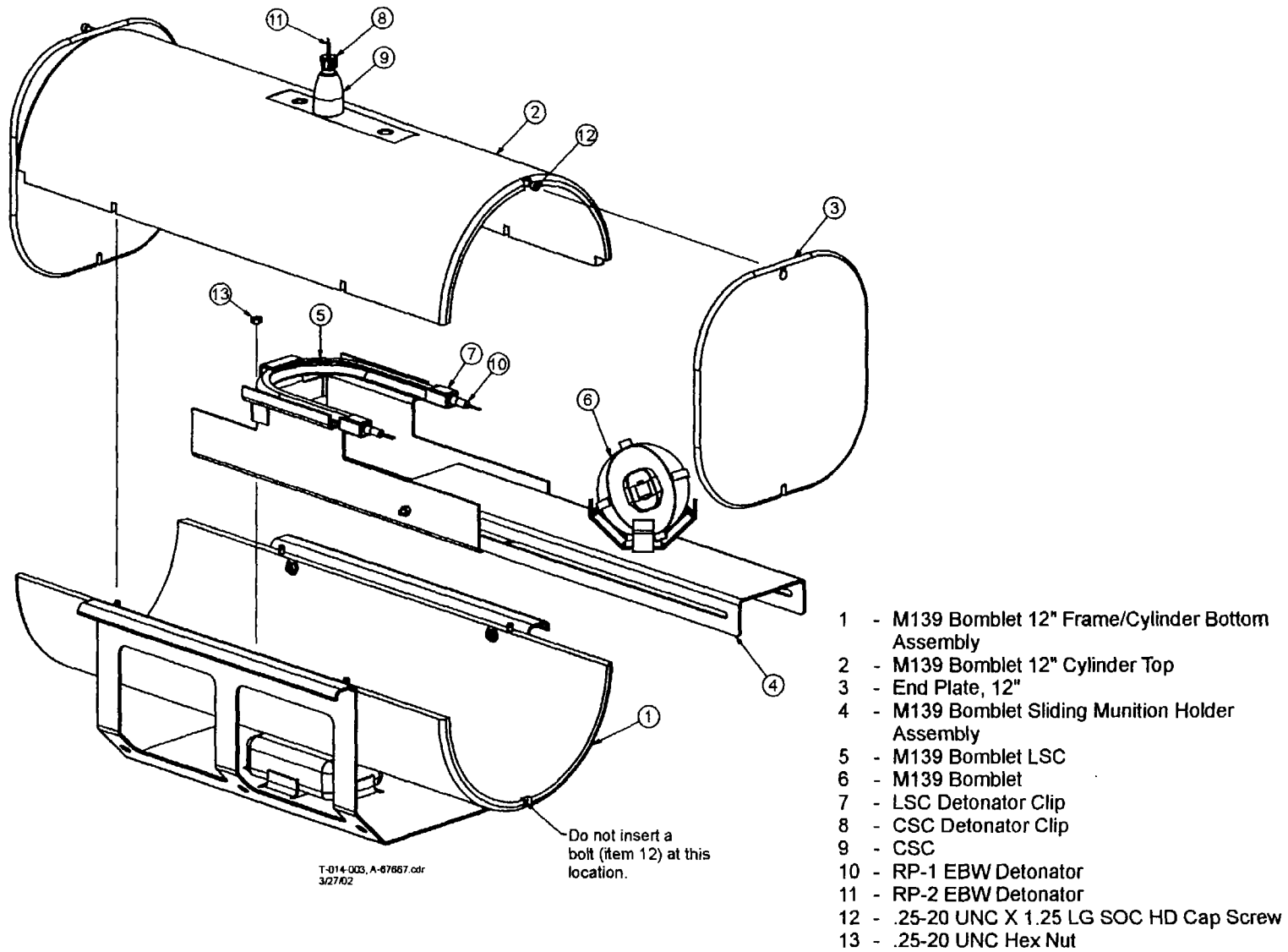


Figure 7-5. M139 Bomblet FSS

- 7.11 **VERIFY** stopper block is positioned directly beneath the CSC hole(s). If not, **DO NOT USE** FSS assembly.
- 7.12 **SUSPEND** rear endplate(s) onto assembled FSS. **TIGHTEN** bolts finger-tight.
- 7.13 **PLACE** O-ring onto nipple of CSC, if necessary.
- 7.14 **ATTACH** RP-2 detonator assembly clip(s) onto each CSC installed.
- 7.15 **PUSH** CSC into hole in cylinder top until seated firmly against machined surface. **SECURE** with tape, as needed.
- 7.16 **COIL** and **CLIP** CSC detonator wires to the outside of cylinder top.
- 7.17 **INSPECT** explosive components for proper configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
- 7.18 **ASSURE** all detonator wires remain free from pinching with front endplate temporarily positioned.

**WARNING**

**ASSEMBLED FSS IS TOO HEAVY FOR ONE PERSON TO HAND CARRY. USE APPROPRIATE NUMBER OF OPERATORS TO MOVE ASSEMBLED FSS TO LOADING TABLE. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.**

- 7.19 **POSITION** assembled FSS on LOADING TABLE.
- 8.0 **LOAD** FSS in EDS CONTAINMENT VESSEL as follows:
  - 8.1 **PERFORM** one of the following:
    - 8.1.1 When FSS is assembled and already on LOADING TABLE, **PROCEED** to Step 8.2.
    - 8.1.2 When FSS is assembled, but not yet placed on LOADING TABLE, **PERFORM** Steps 8.1.2.1 and 8.1.2.2.

- 8.1.2.1 **ASSURE** that LSC and CSC detonator leads are connected to the INTERIOR DETONATOR JACK and are shorted with the INTERIOR DETONATOR SHORTING PLUG.

**WARNING**

**ASSEMBLED FSS WITH THE MUNITION IS TOO HEAVY FOR ONE PERSON TO HAND CARRY. USE APPROPRIATE NUMBER OF OPERATORS TO MOVE ASSEMBLED FSS TO LOADING TABLE. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.**

- 8.1.2.2 **TRANSFER** assembled FSS to LOADING TABLE after having assured all components are configured and properly seated. **PROCEED** to Step 8.2.

- 8.2 **VERIFY** CONTAINMENT VESSEL DOOR will not hamper loading of FSS.

**WARNING**

**FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.**

- 8.3 **VERIFY** Fireset Operator has SAFETY INTERLOCK PLUG and VESSEL ROTATION CONTROL key.
- 8.4 **VERIFY** both door seals are in place and any setup or extraneous materials have been removed from the CONTAINMENT VESSEL and the immediate vicinity.
- 8.5 **CHECK** visually the clearance of FSS cradle with curvature of CONTAINMENT VESSEL interior.
- 8.6 **ASSURE** INTERIOR DETONATOR JACK will reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FLANGE.

- 8.7 **ASSURE** EXTERIOR DETONATOR SHORTING JACK is connected to high voltage feedthrough plugs on outside of HIGH VOLTAGE FLANGE.
- 8.8 **VERIFY** four 50-foot detonator cables are connected to SHORTING CONNECTORS PANEL (CH1 through CH4) on TEST INTERFACE CHASSIS of the FIRING SYSTEM.
- 8.9 **SUSPEND** rear endplate(s) on FSS, if not previously accomplished. **TIGHTEN** bolt finger-tight.

**Caution**

**In the next step, take care that FSS does not contact and damage any sealing surface. Inability to achieve sufficient containment vessel seal will abort operations.**

- 8.10 **LIFT/SLIDE** the FSS into CONTAINMENT VESSEL so that it is approximately centered along longitudinal axis.
- 8.11 **PERFORM** the following steps when loading an M139 bomblet or **PROCEED** to Step 8.12.
  - 8.11.1 **EXTEND** M139 bomblet munition holder out of FSS to a position that facilitates bomblet placement.
  - 8.11.2 **PLACE** M139 bomblet in FSS as follows:

**WARNING**

**EXTREME CARE MUST BE USED WHEN HANDLING AN ARMED MUNITION. DO NOT JAR AN ARMED FUZE.**

**Note**

**In following step, there should be no need to adjust orientation of bomblet.**

- 8.11.2.1 **PLACE** M139 bomblet into M139 bomblet sliding munition holder.

8.11.2.2 **PUSH** M139 bomblet sliding munition holder into the FSS until it comes to a complete stop.

8.11.2.3 **VERIFY** M139 bomblet sliding munition holder is located properly in the FSS and the bomblet is properly indexed in the LSC.

**CALLOUT:** Obtain photographs, if possible.

8.11.2.4 **VERIFY** CSC is still properly seated in the FSS.  
**RE-ROUTE** wires as needed to facilitate mounting front FSS endplate(s).

**WARNING**

**TO PREVENT POSSIBLE INJURY, USE TWO OPERATORS WHEN LIFTING LOADING TABLE.**

8.12 **REMOVE** LOADING TABLE, if used.

8.13 **SUSPEND** front FSS endplate(s) on front end of FSS. **TIGHTEN** bolt finger-tight.

9.0 **CONNECT** FSS detonator cables to HIGH VOLTAGE FLANGE as follows:

9.1 **REMOVE** BLAST COVER from BLAST COVER BASE, if necessary.

9.2 **REMOVE** INTERIOR DETONATOR SHORTING PLUG from INTERIOR DETONATOR JACK.

**Note**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4). (See Figure 7-6.)**

9.3 Securely **CONNECT** INTERIOR DETONATOR JACK to high voltage feedthrough plugs on inside of HIGH VOLTAGE FLANGE.

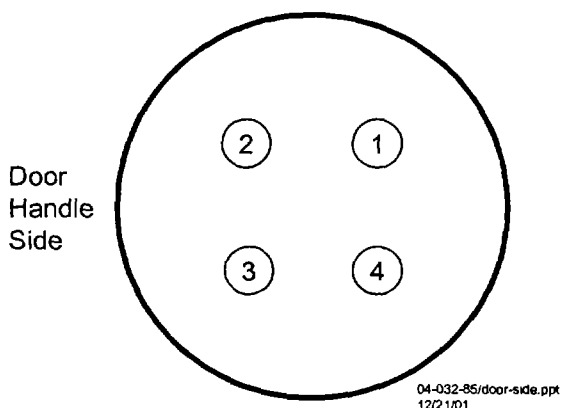


Figure 7-6. High Voltage Flange Interior View

**Note**

**When only three exploding bridge wire detonators are connected to the interior detonator jack, the unused fourth firing cable MUST remain unobstructed. The exterior detonator jack will be connected IAW the SOP to the high voltage flange. During continuity checks, one of the four detonator cables will read OPEN when checked.**

- 9.4 The Team Leader will **VERIFY** that all detonator cables are properly connected to the INTERIOR DETONATOR JACK. The Team Leader will **CALL OUT** which exploding bridge wire is connected to which feedthrough IAW Figure 7-6.

**CALLOUT: Announce feedthrough connections.**

- 9.5 **ROUTE** FSS detonator cables through slot in BLAST COVER BASE.
- 9.6 **INSTALL** BLAST COVER onto BLAST COVER BASE and **AVOID** pinching detonator cables. **TIGHTEN** shoulder bolts using 3/32-inch T-handled wrench.
- 9.7 **RECORD** time munition loaded into CONTAINMENT VESSEL.

**CALLOUT: Announce time munition loaded into containment vessel.**

- 10.0 **PROCEED** to Procedure 8 to take a solid sample of the munition overpack material or **PROCEED** to Procedure 9 to **CLOSE** and **SEAL** the CONTAINMENT VESSEL door.



SPECIAL REQUIREMENTS:

1. PPE must be worn IAW the HASP, if applicable.
2. The EDS operations area must be evacuated.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
EDS operator log	1 each
Indelible ink pen	1 each
Primary tool kit	1 each
Rubber mallet	1 each
Loading table	1 each
FSS	per prescribed munition
Cylinder top	1 each
Frame/cylinder bottom assembly consisting of:	
- Frame	1 each
- Stopper block	1 each
- Cylinder bottom	1 each
- Munition holder	1 each
CSC with O-rings	2 each
LSC	1 each
Strain relief clips (large binder clips)	4 each
LSC detonator clips	2 each
CSC detonator clips	2 each
Duct tape	1 roll
Vessel rotation control key	1 each
Safety interlock plug	1 each
Interior detonator shorting plug	1 each
Interior detonator jack	1 each
Exterior detonator shorting jack	1 each
Blast cover w/base	1 each
Digital camera	1 each

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## PROCEDURE 8 SAMPLE SOLID WASTE

The purpose of this operation is to provide safe operating guidelines for taking a solid waste sample of the munition overpack material. Sampling may be performed during munition unpack, if required.

### PRECONDITIONS:

1. PDS must be available.
  2. Air monitoring must be operational.
- 1.0 **SAMPLE** overpack material.
- 1.1 **SURVEY** the contents of the overpack.
  - 1.2 **OBTAIN** a representative sample of the overpack IAW site-specific procedures.

### Note

**If the munition is wrapped in a plastic bag and a visual inspection determines the munition to be leaking, DO NOT take a sample of the plastic bag, and omit Step 1.2.1.**

- 1.2.1 **CUT** a piece of the plastic bag, if one is present.
  - 1.2.2 **TAKE** pieces of the cushioning material in the container.
  - 1.2.3 **WIPE** the inner liner of the overpack with a chemical swipe.
  - 1.3 **PLACE** the representative sample in a sample container or bag.
  - 1.4 **SEAL** the sample container or sample bag.
- 2.0 **DECONTAMINATE** and **PACKAGE** solid sample overpack waste as follows:
- 2.1 **PLACE** sample container in pail of decontaminant.
  - 2.2 **REMOVE** sample container from decontaminant pail and **PLACE** into pail of rinsewater.

- 2.3 **PLACE** sample container in a bag, and **MONITOR** sample container to assure it is below criteria for permissible exposure level. **RECORD** contamination status of sample container/bag.
- 2.4 **PLACE** sample container into packaging.
- 2.5 **SEAL** container.
- 2.6 **CARRY** sample package(s) to PDS.
- 2.7 **COMPLETE** required chain-of-custody documents (Annex A, Figures A-3 and A-4).
- 2.8 **ATTACH** chain-of-custody documents to packed sample and **TRANSPORT** to laboratory via courier.
- 3.0 **CONTINUE** cleanup as follows:
  - 3.1 **PLACE** the remaining overpack materials in a solid waste drum.
  - 3.2 **PLACE** wastewater in a liquid waste drum.
  - 3.3 **PLACE** the rag used to decontaminate sample container into solid waste drum.
  - 3.4 **CLOSE** solid waste drum.
- 4.0 **PROCEED** to Procedure 9.

SPECIAL REQUIREMENTS:

- 1. PPE must be worn IAW the HASP, if applicable.
- 2. The EDS operations area must be evacuated.
- 3. The laboratory courier must be available.
- 4. Sample containers must be approved IAW the Laboratory Quality Control Plan.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Waste labels	as required
Chain-of-custody documents	as required
Indelible ink pen (black)	1 box
Sampling tools	as required
Sample bag or secondary container	as required
Sample packaging	as required
Rags or paper towels	as required
Liquid/solid waste containers	as required
Water	as required
Brushes	as required
Sponges	as required
Bleach	as required
Liquid/solid waste catch tray	1 each
EDS operator log	1 each

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## **PROCEDURE 9**

### **CLOSING AND SEALING CONTAINMENT VESSEL DOOR**

The purpose of this procedure is to close and seal the EDS containment vessel prior to detonating the munition.

#### **PRECONDITIONS:**

1. Air monitoring must be operational.
2. Setup and daily startup checklists have been completed.
3. Helium leak detector must be set up, calibrated, operational, and the main switch must be in the ON position.
4. Munition must be loaded into containment vessel.
5. Metal seals must be inspected.

#### **WARNING**

**NEVER ATTEMPT TO GRASP A LEAKING HOSE UNDER PRESSURE WITH HANDS. THE FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY.**

1.0 **CLOSE** CONTAINMENT VESSEL door as follows:

- 1.1 **VERIFY** clamps are positioned so as not to interfere with movement of CONTAINMENT VESSEL door.

#### **WARNING**

**THE CONTAINMENT VESSEL DOOR PRESENTS CRUSHING OR PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.**

- 1.2 **DON** leather gloves over rubber gloves.

- 1.3 Carefully **ROUTE** the FSS detonator cables to avoid pinching them when the CONTAINMENT VESSEL door is CLOSED.
- 1.4 **CLOSE** CONTAINMENT VESSEL door without pinching detonator cables.
- 2.0 **SECURE** CONTAINMENT VESSEL door clamp as follows:
  - 2.1 **PUSH** clamp closed.
  - 2.2 **VERIFY** hydraulic nuts are fully retracted.

**Caution**

**In Step 3.0, top and bottom gaps of clamp faces must be within 1/2-inch difference and closed to less than 1-5/8 inches. Inconsistent gaps may damage hydraulic nuts and result in seal leakage.**

- 3.0 **TIGHTEN** hydraulic nuts on CONTAINMENT VESSEL door clamp as follows:
  - 3.1 **VERIFY** flats on hydraulic nuts are properly aligned.
  - 3.2 Using a wrench or by hand, evenly **TIGHTEN** the four 3-1/2-inch knurled nuts. **VERIFY** top and bottom gaps between clamp faces are less than 1-5/8 inches and that flats on hydraulic nuts are still properly aligned.
  - 3.3 **RECORD** upper and lower gap space measurement.
- 4.0 **OPERATE** HYDRAULIC TENSIONER SUBSYSTEM as follows:
  - 4.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
  - 4.2 **VERIFY** all four hydraulic nut hoses and Hydraulic Pump Hose are connected to hydraulic manifold, are not leaking, and red Hydraulic Nut Pump OFF button is illuminated.
  - 4.3 **TURN** red PRESSURE switch on VESSEL CONTROL panel to LOW.
  - 4.4 **PRESS** green ON button on Hydraulic Nut Pump panel to start hydraulic pump and **MONITOR** all four hydraulic nuts.



**WARNING**

**NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH THREADED RODS WHEN TENSIONER IS UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

- 4.5 **VERIFY** all personnel are clear of hydraulic nut and hydraulic hoses.
- 4.6 **PUSH** and **HOLD** ADVANCE button on Hydraulic Nut Pump panel.
- 4.7 When hydraulic pump shuts off, **CHECK** hydraulic pump pressure gauge for reading between 7,000 to 7,300 pounds per square inch gauge (psig).
- 4.8 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 4.9 **PUSH** and **HOLD** RETRACT button on Hydraulic Nut Pump panel to release hydraulic pressure.
- 4.10 **VERIFY** that pump pressure gauge reads approximately 0 psig.
- 5.0 **STOP** HYDRAULIC TENSIONER SUBSYSTEM as follows:
  - 5.1 **PRESS** red OFF button on Hydraulic Nut Pump panel to stop hydraulic pump.
  - 5.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Docking Station.
  - 5.3 **RECORD** time CONTAINMENT VESSEL door closed and secured.
- CALLOUT:** Announce time containment vessel door is closed and secured.
- 6.0 **TEST** CONTAINMENT VESSEL door seal for leaks. **PROCEED** as follows:
  - 6.1 **PROCEED** to Step 7.0 to use primary HELIUM LEAK DETECTOR (ASM 142).
  - 6.2 **PROCEED** to Step 15.0 to use alternate HELIUM LEAK DETECTOR (ASM 120).
- 7.0 **PREPARE** helium leak test using primary HELIUM LEAK DETECTOR (ASM 142) as follows:
  - 7.1 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED.

7.2 **ATTACH** remote control to remote control connection (29 in Figure 9-1) on the control panel, if used.

7.3 **PRESS** main POWER switch to ON, if not previously turned on.

**Note**

**Leak detector will automatically go through a setup procedure and calibration. This will typically take 2 to 3 minutes.**

7.4 **OBSERVE** that alphanumeric display (17 in Figure 9-1), displays "READY FOR CYCLE."

7.5 **REMOVE** clamp and vacuum flange (V-F) cover from LEAK DETECTOR HOSE LD and dust cap from V-F fitting on CONTAINMENT VESSEL door.

7.6 **CLAMP** LEAK DETECTOR HOSE LD to V-F fitting on right side of CONTAINMENT VESSEL door.

**Note**

**Leak detector will automatically go into the cycle mode and evacuate the leak detector hose assembly and the containment vessel door.**

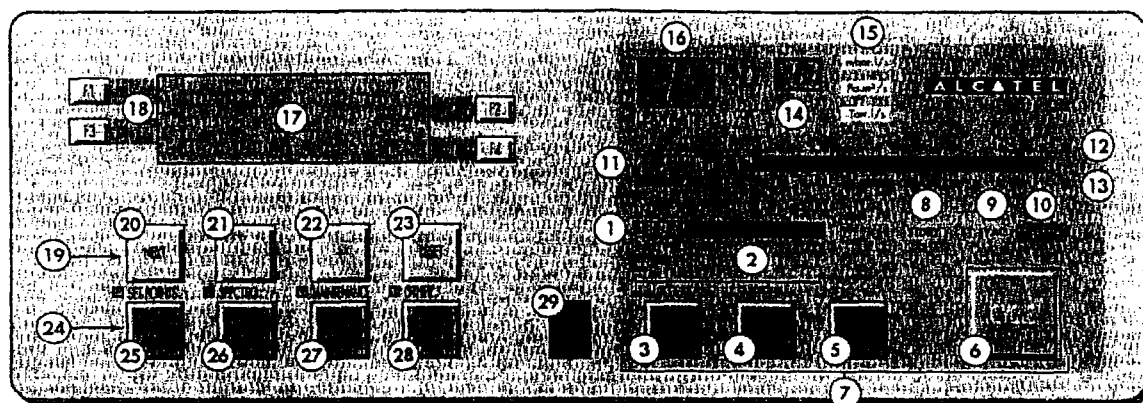
7.7 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:

7.7.1 **PRESS** CYCLE button (6 in Figure 9-1) on control panel.

7.7.2 **PRESS** CYCLE button on remote control (6 in Figure 9-2) (green CYCLE ON indicator [5 in Figure 9-2] illuminates).

7.8 **OBSERVE** the helium signal digital display (16 in Figure 9-1) or remote control (1 in Figure 9-2) until display figures stabilize. Recommended time is 5 minutes.

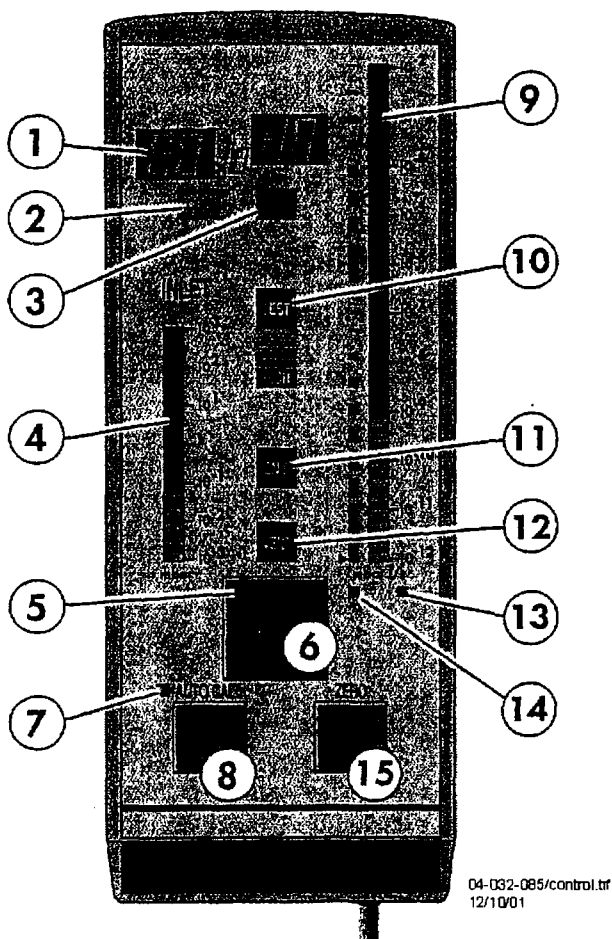
## Control panel



- 1 Inlet port pressure analog display
- 2 Control and menu selection indicators (ON when activated)
- 3 Auto-calibration START/ABORT control key
- 4 Sniffing mode ON/OFF control key
- 5 Auto-zero ON/OFF control key
- 6 Cycle START/STOP control key
- 7 Control keys (4 keys)
- 8 Standby ON/OFF indicator
- 9 Evacuation ON/OFF indicator
- 10 Test ON/OFF indicator
- 11 Helium signal analogic display
- 12 Helium signal analogic scale ON/OFF indicator
- 13 Helium signal Zero scale ON/OFF indicator
- 14 Correction factor COR indicator (applied to digital display)
- 15 Units ON/OFF indicator
- 16 Helium signal digital display
- 17 Alphanumeric display (4 lines x 20 characters)
- 18 Parameter function keys (1 key per display line)
- 19 Modification access keys (4 keys)
- 20 NEXT : next display/parameter circular function
- 21 & 22 Plus or minus value adjustment, parameter selection, audio volume adjustment keys
- 23 RESET of previously displayed values (cancels temporary inputs)
- 24 Menu selection access keys (4 keys)
- 25 SET POINT menu selection key
- 26 SPECTRO calibration and analyzer cell configuration menu selection key
- 27 MAINTENANCE menu selection key
- 28 OTHER menus selection key (test mode selection, inlet VENT selection, date/time)
- 29 Remote control connection (accessory)

Figure 9-1. ASM 142 Helium Leak Detector Control Panel

# Remote control interface



- |   |  |    |  |
|---|--|----|--|
| 1 | Helium Signal digital display                  | 9  | Helium signal analogic display               |
| 2 | Correction factor COR indicator                | 10 | Test ON indicator                            |
| 3 | Zero function indicator                        | 11 | Sniffing test mode ON indicator              |
| 4 | Inlet port pressure analog display             | 12 | Inlet VENT ON indicator                      |
| 5 | Test cycle ON indicator<br>(ON when activated) | 13 | Helium signal standard scale ON<br>indicator |
| 6 | Cycle Start/stop control key                   | 14 | Helium signal Zero scale ON<br>indicator     |
| 7 | Calibration in progress indicator              | 15 | Zero ON/OFF control key                      |
| 8 | Auto-calibration start control key             |    |  |

Figure 9-2. ASM 142 Helium Leak Detector Remote Control

**Note**

**Steps 7.9 through 7.9.2 may be performed during pump down, if not already accomplished.**

7.9 **VERIFY** helium gas cylinder is prepared as follows:

7.9.1 **PROCEED** to Step 7.10 when helium pressure regulator is installed on helium gas cylinder.

7.9.2 **REFER** to EDS Phase 1 Units 2 and 3 (P1U2&3) O&M setup procedures to install helium pressure regulator, if not previously installed.

7.10 **PERFORM** helium transfer to CONTAINMENT VESSEL as follows:

7.10.1 **ADJUST** helium regulator gauge on REAGENT SUPPLY PLATFORM to 60 psig.

7.10.2 **CONNECT** supply hose QS to Q19 on CONTAINMENT VESSEL door.

7.10.3 **OPEN** valve 23.

7.10.4 **OPEN** valves 38, 19, and 21.

**Notes**

**Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.**

**If unable to obtain proper pressure in containment vessel, verify all valves on containment vessel door are CLOSED. Refer to EDS P1U2&3 O&M procedures for helium cylinder setup.**

**Venting the containment vessel is not required if containment vessel pressure exceeds 65 psig in Step 7.10.5.**

7.10.5 **OBSERVE** CONTAINMENT VESSEL internal pressure until  $60 \pm 5$  psig is displayed on CONTAINMENT VESSEL pressure indicator.

- 7.10.6 **MONITOR** the helium signal digital display (16 in Figure 9-1) or remote control (1 in Figure 9-2) until display figures stabilize. Recommended time is 5 minutes.

**Note**

**Leak rate is achieved when it has reached equilibrium. Allow 5 minutes for helium leak detector to reach equilibrium.**

- 7.11 **RECORD** helium leak rate as follows:

- 7.11.1 **READ** leak rate on helium signal digital display (16 in Figure 9-1) or on remote control (1 in Figure 9-2).

- 7.11.2 **RECORD** leak rate.

**CALLOUT:** Announce value of leak rate obtained.

- 7.11.3 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:

- 7.11.3.1 **PRESS** CYCLE button (6 in Figure 9-1) on control panel.

- 7.11.3.2 **PRESS** CYCLE button on remote control (6 in Figure 9-2) (green CYCLE ON indicator [5 in Figure 9-2] goes out).

- 7.12 **PERFORM** helium leak test on HIGH VOLTAGE FLANGE as follows:

- 7.12.1 **RELEASE** LEAK DETECTOR HOSE from V-F fitting on the right side of CONTAINMENT VESSEL door. **INSTALL** dust cap on CONTAINMENT VESSEL door.

- 7.12.2 **REMOVE** dust cap from HIGH VOLTAGE FLANGE and **CONNECT** LEAK DETECTOR HOSE to V-F fitting on HIGH VOLTAGE FLANGE.

**Note**

**Leak detector will automatically go into the cycle mode and evacuate the leak detector hose assembly and high voltage flange.**

7.12.3 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:

7.12.3.1 **PRESS** CYCLE button (6 in Figure 9-1) on control panel.

7.12.3.2 **PRESS** CYCLE button on remote control (6 in Figure 9-2) (green CYCLE ON indicator [5 in Figure 9-2] illuminates).

7.12.4 **OBSERVE** the helium signal digital display (16 in Figure 9-1) or remote control (1 in Figure 9-2) until display figures stabilize. Recommended time is 5 minutes.

**Note**

**Leak rate is achieved when it has reached equilibrium. Allow 5 minutes for helium leak detector to reach equilibrium.**

7.12.5 **READ** leak rate on helium signal digital display (16 in Figure 9-1) or remote control (1 in Figure 9-2). **RECORD** leak rate.

**CALLOUT:** Announce value of leak rate obtained.

7.12.6 **CLOSE** valve 19.

7.13 **REQUEST** permission to proceed. **PERFORM** one of the following:

7.13.1 **PROCEED** to Step 8.0 when permission is granted.

7.13.2 **PROCEED** to Step 14.0 when directed to open **CONTAINMENT VESSEL** door to inspect sealing surfaces.

8.0 **VENT** CONTAINMENT VESSEL as follows:

8.1 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:

8.1.1 **PRESS** CYCLE button (6 in Figure 9-1) on control panel.

8.1.2 **PRESS** CYCLE button on remote control (6 in Figure 9-2) (green CYCLE ON indicator [5 in Figure 9-2] goes out).

8.2 **VERIFY** filter cap is removed and carbon-retaining collar is tightly screwed onto waste drum filter.

- 8.3 **VERIFY** VESSEL WASTE DRUM HOSE is connected from QD1 to drum 1 and WASTE DRUM VENT HOSE is connected between drums 1 and 2.
- 8.4 **VERIFY** valve 29 is OPEN to "D1" position (white arrow on lever points to D1) and **CLOSE** valve 38.
- 8.5 **PREPARE** to vent CONTAINMENT VESSEL by slowly opening valve 18. Slowly **OPEN** valve 19 to avoid compromising waste drum integrity.
- 8.6 **CLOSE** valve 18 after vessel achieves atmospheric pressure.
- 9.0 **TURN OFF** HELIUM LEAK DETECTOR as follows:
  - 9.1 **PRESS** the main POWER switch to OFF.
  - 9.2 **RELEASE** LEAK DETECTOR HOSE from V-F fitting on the right side of the HIGH VOLTAGE FLANGE. **INSTALL** dust cap on V-F fitting.
  - 9.3 **PLACE** blank V-F on end of LEAK DETECTOR HOSE and **CONNECT** to Docking Station.
  - 9.4 **CLOSE** all valves on CONTAINMENT VESSEL door.
  - 9.5 **DISCONNECT** supply hose QS from Q19, and **RECORD** time leak test completed.
- CALLOUT: Announce time containment vessel door leak test completed.**
- 10.0 **CHECK** sample valve assembly installation.
  - 10.1 **PROCEED** to Procedure 10 when sample valve assemblies are installed.
  - 10.2 **PROCEED** to Step 11.0 to install a vapor or Tedlar<sup>®</sup> sample valve assembly and/or to Step 12.0 to install a liquid sample valve assembly.
- 11.0 **INSTALL** vapor sample valve assembly (valve 20) or Tedlar<sup>®</sup> bag sample valve assembly as follows:
  - 11.1 **INSPECT** assembly for serviceability. **DISCARD, REPLACE, and RECORD** on sample log when assembly is damaged.
  - 11.2 **CHECK** assembly has correct sample number label.



**Note**

**Once per day, use thread lubricant on external threads of valve piping prior to installing sample valve assemblies.**

- 11.3 **LOOSEN** handle securing valve 19 to bracket, and **SLIDE** valve 19 to left.
- 11.4 **TIGHTEN** both stop collars (left-hand threads) on sample piping finger-tight and **BACK OFF** 1/4 turn.
- 11.5 **SLIP** assembly on stem of valve 21.
- 11.6 **SLIDE** valve 19 toward assembly, and **FINGER-TIGHTEN** both fittings on right and left of assembly.
- 11.7 **HOLD** assembly body with 3/4-inch open-end wrench, and **TIGHTEN** both fittings to 30 foot-pounds (ft-lbs) using appropriate torque wrench.
- 11.8 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 19 and 21.
- 12.0 **INSTALL** liquid sample valve assembly (valve 25) as follows:
  - 12.1 **INSPECT** liquid sample valve assembly for serviceability. **DISCARD**, **REPLACE**, and **RECORD** on sample log when assembly is damaged.
  - 12.2 **ASSURE** liquid sample valve assembly has correct sample label on it.

**Note**

**Once per day, use thread lubricant on external threads of valve piping prior to installation of liquid sample valve.**

- 12.3 **LOOSEN** handle securing valve 24 to the bracket, and **SLIDE** valve 24 to the left.
- 12.4 **TIGHTEN** both stop collars on sample piping finger-tight and **BACK OFF** 1/4 turn.
- 12.5 **SLIP** liquid sample valve assembly onto the stem of valve 26.
- 12.6 **SLIDE** valve 24 toward liquid sample valve assembly, and **FINGER-TIGHTEN** both fittings on left and right of assembly.

- 12.7 **HOLD** liquid sample valve assembly body with 3/4-inch open-end wrench and **TIGHTEN** both fittings to 30 ft-lbs, using the appropriate torque wrench.
- 12.8 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 24 and 26.
- 12.9 **TIGHTEN** handle securing valve 24.
- 13.0 **PROCEED** to Procedure 10.

**UNUSUAL OPERATION:**

- 14.0 **OPEN** CONTAINMENT VESSEL door and **INSPECT** CONTAINMENT VESSEL door seals as follows:

**WARNING**

**NEVER OPEN CONTAINMENT VESSEL DOOR WHEN CONTAINMENT VESSEL PRESSURE EXCEEDS ATMOSPHERIC PRESSURE. INTERNAL PRESSURE MAY FORCE DOOR OPEN PREMATURELY WHEN CLAMPS ARE LOOSENEED, RESULTING IN POSSIBLE INJURY OR DAMAGE.**

- 14.1 **VENT** CONTAINMENT VESSEL as follows:
  - 14.1.1 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:
    - 14.1.1.1 **PRESS** CYCLE button (6 in Figure 9-1) on control panel.
    - 14.1.1.2 **PRESS** CYCLE button on remote control (6 in Figure 9-2) (green CYCLE ON indicator [5 in Figure 9-2] goes out).
  - 14.1.2 **VERIFY** filter cap is removed and carbon-retaining collar is tightly screwed onto waste drum filter.
  - 14.1.3 **VERIFY** supply hose QS is connected to valve 19, and valve 29 is OPEN to "D1" position (white arrow on valve 29 lever points to D1).

- 14.1.4 **VERIFY** VESSEL WASTE DRUM HOSE is connected from QD1 to drum 1 and WASTE DRUM VENT HOSE is connected between drums 1 and 2. **CLOSE** valve 38.
- 14.1.5 **PREPARE** to vent CONTAINMENT VESSEL by slowly opening valve 18. Slowly **OPEN** valve 19 to avoid compromising waste drum integrity.
- 14.1.6 **VERIFY** CONTAINMENT VESSEL pressure is at atmospheric pressure. **CLOSE** valve 18.
- 14.2 **TURN OFF** HELIUM LEAK DETECTOR as follows:
  - 14.2.1 **PRESS** the main POWER switch to OFF.
  - 14.2.2 **RELEASE** LEAK DETECTOR HOSE from V-F fitting on the right side of the HIGH VOLTAGE FLANGE. **INSTALL** dust cap on V-F fitting.
  - 14.2.3 **PLACE** blank V-F on end of LEAK DETECTOR HOSE and **CONNECT** to Docking Station.
  - 14.2.4 **CLOSE** valves 21 and 19. **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station.
- 14.3 **START** HYDRAULIC TENSIONER SUBSYSTEM as follows:
  - 14.3.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
  - 14.3.2 **VERIFY** all four hydraulic nut hoses are securely connected, are not leaking, and red Hydraulic Nut Pump OFF button is illuminated.
  - 14.3.3 **TURN** red PRESSURE switch on CONTAINMENT VESSEL control panel to HIGH.
  - 14.3.4 **PRESS** green ON button on Hydraulic Nut Pump panel to start hydraulic pump.

**WARNING**

**NEVER STAND OR PLACE ANY PARTS OF BODY IN LINE WITH  
THREADED RODS WHEN HYDRAULIC NUTS ARE UNDER PRESSURE.**

14.4 **RELEASE** hydraulic nuts as follows:

- 14.4.1 **VERIFY** all personnel are clear of nuts and hydraulic hoses.
- 14.4.2 **PUSH** and **HOLD** ADVANCE button on Hydraulic Nut Pump panel to tension hydraulic nuts.
- 14.4.3 When hydraulic pump shuts off, **CHECK** pump pressure gauge for reading between 7,600 and 7,900 psig.
- 14.4.4 **PUT ON** leather gloves to protect rubber gloves.
- 14.4.5 **TURN** locking rings counterclockwise simultaneously to loosen top and bottom, until all four are flush with piston end.
- 14.4.6 **PUSH** RETRACT button on Hydraulic Nut Pump panel to release hydraulic pressure. **ASSURE** hydraulic nuts are fully retracted.

14.5 **STOP** HYDRAULIC TENSIONER SUBSYSTEM as follows:

- 14.5.1 **PRESS** red OFF button on Hydraulic Nut Pump panel.
- 14.5.2 **CHECK** that pressure gauge reads approximately 0 psig.
- 14.5.3 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Docking Station.

14.6 **OPEN** CONTAINMENT VESSEL door as follows:

- 14.6.1 **VERIFY** leather gloves are worn over rubber gloves.
- 14.6.2 **LOOSEN** the four 3-1/2-inch hex nuts to outer end of each stud.
- 14.6.3 **PUSH** clamp open, and **POSITION** clamp so it does not interfere with CONTAINMENT VESSEL door movement.
- 14.6.4 **OPEN** CONTAINMENT VESSEL door just enough to reach inside CONTAINMENT VESSEL, and **REMOVE** INTERIOR DETONATOR JACK.
- 14.6.5 **RECORD** CONTAINMENT VESSEL door opening time.

**CALLOUT:** Announce time when containment vessel door is opened.

- 14.6.6 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
- 14.6.7 **OPEN** CONTAINMENT VESSEL door fully.

14.7 **PERFORM**, as directed by the EDS Crew Supervisor, one of the following:

14.7.1 When directed not to remove the FSS and munition, **PROCEED** to Step 14.8.

14.7.2 When directed to remove the FSS and munition, **PERFORM** the following:

14.7.2.1 **REMOVE** explosive shaped charges as follows:

14.7.2.1.1 **REMOVE** CSCs one at a time from the vessel and **REMOVE** detonators.

14.7.2.1.2 **PLACE** CSCs in safe place (that is, shipping container).

14.7.2.1.3 **REMOVE** endplate(s) from front end of FSS and **PLACE** away from CONTAINMENT VESSEL.

14.7.2.1.4 **REMOVE** rear endplate(s) from the FSS and allow them to lean against CONTAINMENT VESSEL rear.

14.7.2.1.5 **REMOVE** detonators from LSC and **PLACE** LSC in safe place (that is, shipping container).

14.7.2.1.6 **PLACE** INTERIOR DETONATOR JACK with detonators attached in safe place (that is, shipping container).

14.7.2.1.7 **REMOVE** top half of FSS and **PLACE** away from loading area.

14.7.2.1.8 **REMOVE** LSC from FSS if possible and **PROCEED** to Step 14.7.2.2.

**WARNING**

**EXTREME CAUTION MUST BE USED WHEN HANDLING AN ARMED MUNITION. DO NOT JAR ARMED FUZE.**

14.7.2.2 **REMOVE** unexploded munition from CONTAINMENT VESSEL based upon EOD decision by performing one of the following:

14.7.2.2.1 **REMOVE** munition from cylinder bottom of FSS while FSS is still in CONTAINMENT VESSEL as follows:

14.7.2.2.1.1 **REMOVE** munition from cylinder bottom of FSS and **PLACE** the munition in a safe place.

14.7.2.2.1.2 **INSTALL** LOADING TABLE, and **SLIDE** FSS from CONTAINMENT VESSEL onto LOADING TABLE.

14.7.2.2.1.3 **PROCEED** to Step 14.7.2.2.2.3.

14.7.2.2.2 **REMOVE** FSS with munition from CONTAINMENT VESSEL.

14.7.2.2.2.1 **INSTALL** LOADING TABLE, and **SLIDE** FSS with munition from CONTAINMENT VESSEL onto LOADING TABLE.

14.7.2.2.2.2 **REMOVE** munition from FSS, and **PLACE** munition in a safe place.

14.7.2.2.2.3 **REMOVE** LSC if still in the FSS, and **LEAVE** FSS on LOADING TABLE.

14.7.2.2.2.4 **REMOVE** rear endplate(s) from CONTAINMENT VESSEL.

14.7.2.2.2.5 **VERIFY** explosive items are properly shunted and secured.

14.8 **SERVICE CONTAINMENT VESSEL.**

14.8.1 **REMOVE** CONTAINMENT VESSEL door and/or HIGH VOLTAGE FLANGE seals, and **CLEAN** sealing surfaces IAW EDS P1U2&3 O&M Procedures, Chapter 5, CNV-18, CNV-19, and CNV-21.

14.8.2 **REPLACE** metal seal and/or O-ring on CONTAINMENT VESSEL door and/or HIGH VOLTAGE FLANGE IAW EDS P1U2&3 O&M Procedures, Chapter 5, CNV-18, CNV-19, and CNV-21.

14.8.3 **REPEAT** Steps 1.0 through 5.3 to close CONTAINMENT VESSEL door and then **PROCEED** to Step 14.8.4.

14.8.4 **REPEAT** helium leak test procedures by performing Steps 7.0 through 7.11.3.2 for the CONTAINMENT VESSEL door and/or Steps 7.12 through 7.12.5 for the HIGH VOLTAGE FLANGE.

14.8.5 **READ** the leak rate on helium signal digital display (16 in Figure 9-1). **RECORD** leak rate.

**CALLOUT:** Announce time containment vessel door leak test completed.

14.8.6 **CLOSE** valve 19. **REQUEST** permission to proceed and **PERFORM** one of the following:

14.8.6.1 When permission is granted, **PERFORM** one of the following:

14.8.6.1.1 When FSS and munition are in the CONTAINMENT VESSEL, **RETURN** to Step 8.0.

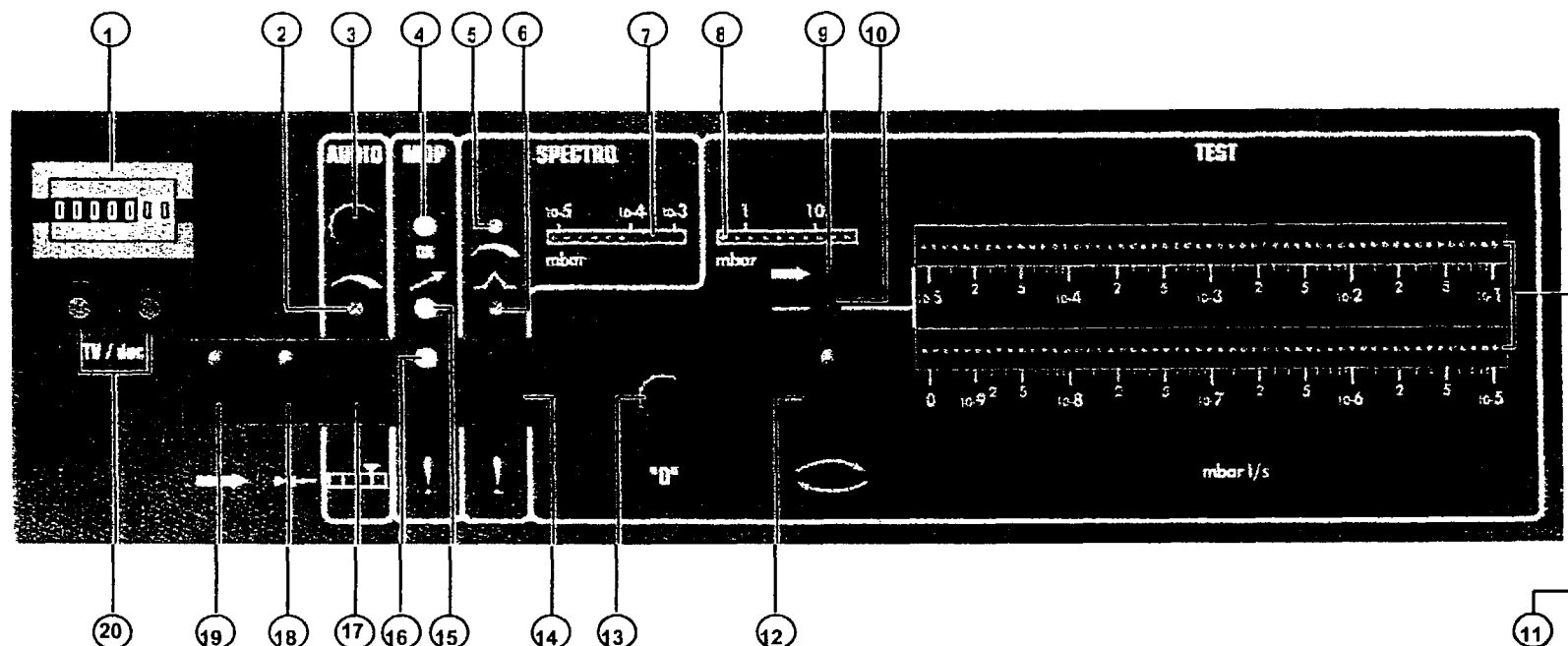
14.8.6.1.2 When FSS and munition are not in CONTAINMENT VESSEL, **RETURN** to Steps 14.0 through 14.6.7 to open CONTAINMENT VESSEL door and then **PROCEED** to Procedure 7.

- 14.8.6.2 When permission is not granted to proceed, **RETURN** to and **PERFORM** Steps 14.0 through 14.6.7 to open CONTAINMENT VESSEL door and then **PROCEED** as directed by EDS Crew Supervisor as follows:
  - 14.8.6.2.1 When directed not to remove FSS and munition, **PROCEED** to Step 14.8.7.
  - 14.8.6.2.2 When directed to remove FSS and munition, **RETURN** and **PERFORM** Steps 14.7.2.1 through 14.7.2.2.5 and then **PROCEED** to Step 14.8.7.
- 14.8.7 **PROCEED** when directed to EDS P1U2&3 O&M Procedures, Chapter 5, CNV-8 to inspect and tighten fittings and fasteners on CONTAINMENT VESSEL door.
- 14.8.8 **PROCEED** as directed by EDS Crew Supervisor.

**ALTERNATE PROCEDURE:**

- 15.0 **PREPARE** helium leak test using alternate HELIUM LEAK DETECTOR (ASM 120) as follows:
  - 15.1 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED.
  - 15.2 **PRESS** Venting Control button (18 in Figure 9-3) on HELIUM LEAK DETECTOR CONTROL PANEL to release pressure and **OBSERVE** pilot light ON button illuminates.
  - 15.3 **REMOVE** V-F cover and **VERIFY** O-ring remains on HELIUM LEAK DETECTOR.
  - 15.4 **CLAMP** vacuum flex hose to leak detector inlet, and **ATTACH** other end of vacuum flex hose to extension pipe V-F fitting above leak detector housing.
  - 15.5 **REMOVE** V-F cover from LEAK DETECTOR HOSE LD and **CONNECT** hose to V-F fitting on right side of CONTAINMENT VESSEL door.
  - 15.6 **PRESS** Gross Leak Control button (19 in Figure 9-3) to set HELIUM LEAK DETECTOR in gross leak mode and **OBSERVE** pilot light ON button illuminates.
  - 15.7 **PRESS** Venting Control button (18 in Figure 9-3) and **OBSERVE** pilot light ON button extinguishes.





1	Hour Counter	8	Inlet Pressure Display	15	MDP Acceleration Light
2	Setpoint Adjustment	9	Gross Leak "Ready" light	16	Converter Fault Light
3	Buzzer Volume Adjustment	10	Fine Leak "Ready" light	17	Setpoint Display Control
4	MDP Normal Speed Light	11	Helium Signal Displays	18	Venting Control Button
5	Cell Emission Current Adjustment	12	Cycle Control Button	19	Gross Leak Control Button
6	Helium Peak Adjustment	13	Helium Zero Adjustment	20	Recording Outputs 1V Per Decade
7	Spectro	14	Triode Pressure Fault Light; Filament Resend & "OFF" Button		

Figure 9-3. ASM 120 Helium Leak Detector Control Panel

- 15.8 **OBSERVE** HELIUM LEAK DETECTOR CONTROL PANEL until display figures stabilize. **PRESS** Cycle Control button (12 in Figure 9-3) and **OBSERVE** that Gross Leak Ready light (9 in Figure 9-3) illuminates.
- 15.9 **WAIT** 10 to 15 minutes (pump down) to evacuate space between metal seal and O-ring on CONTAINMENT VESSEL door.

**Note**

**Step 15.10 may be performed during pump down, if not already performed.**

15.10 **VERIFY** helium gas cylinder is prepared as follows:

15.10.1 **PROCEED** to Step 15.11 when helium pressure regulator is installed on helium gas cylinder.

15.10.2 **REFER** to EDS P1U2&3 O&M Procedures for helium pressure regulator installation and then **PROCEED** to Step 15.11.

15.11 **PERFORM** helium transfer to CONTAINMENT VESSEL as follows:

15.11.1 **CONNECT** supply hose QS to Q19 on CONTAINMENT VESSEL door.

15.11.2 **OPEN** valve 23.

15.11.3 **OPEN** valves 38, 19, and 21.

**Notes**

**Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on vessel control panel.**

**If unable to obtain proper pressure in containment vessel, verify all valves on containment vessel door are CLOSED. Refer to EDS P1U2&3 O&M procedures for helium cylinder setup.**

**Venting the containment vessel is not required when containment vessel pressure exceeds 65 psig in Step 15.11.4.**

15.11.4 **OBSERVE** CONTAINMENT VESSEL internal pressure until  $60 \pm 5$  psig is displayed on CONTAINMENT VESSEL pressure indicator.

15.11.5 **VERIFY** display figures on HELIUM LEAK DETECTOR CONTROL PANEL have stabilized (completion of 10- to 15-minute pump down on CONTAINMENT VESSEL door).

**Note**

**Leak rate is achieved when it has reached equilibrium. Allow 5 to 10 minutes for helium leak detector to reach equilibrium.**

15.12 **READ** leak rate on display located on top of HELIUM LEAK DETECTOR display (11 in Figure 9-3). **RECORD** leak rate.

**CALLOUT:** Announce value of leak rate obtained.

15.13 **PERFORM** helium leak test on HIGH VOLTAGE FLANGE as follows:

15.13.1 **PRESS** the Cycle Control button (12 in Figure 9-3) on helium detector to isolate the leak detector and **RELEASE** pressure from leak detector by pressing Venting Control button (18 in Figure 9-3).

15.13.2 **RELEASE** LEAK DETECTOR HOSE from V-F fitting on right side of CONTAINMENT VESSEL door.

15.13.3 **CONNECT** LEAK DETECTOR HOSE to V-F fitting on HIGH VOLTAGE FLANGE.

15.13.4 **START** HELIUM LEAK DETECTOR as follows:

15.13.4.1 **PRESS** Gross Leak Control button (19 in Figure 9-3) to set HELIUM LEAK DETECTOR in gross leak mode and **OBSERVE** pilot light ON button illuminates.

15.13.4.2 **PRESS** Venting Control button (18 in Figure 9-3) and **OBSERVE** pilot light ON button extinguishes.

15.13.4.3 **OBSERVE** HELIUM LEAK DETECTOR CONTROL PANEL until display figures stabilize. **PRESS** Cycle Control button (12 in Figure 9-3) and **OBSERVE** that Gross Leak Ready light (9 in Figure 9-3) illuminates.

15.13.4.4 **WAIT** 10 to 15 minutes (pump down) to evacuate space between metal seal and O-ring on HIGH VOLTAGE FLANGE.

**Note**

**Leak rate is achieved when it has reached equilibrium. Allow 5 to 10 minutes for helium leak detector to reach equilibrium.**

- 15.13.4.5 **READ** leak rate on display located on top of HELIUM LEAK DETECTOR display (11 in Figure 9-3).  
**RECORD** leak rate.

**CALLOUT:** Announce value of leak rate obtained

- 15.14 **REQUEST** permission to proceed. **PROCEED** as directed and **PERFORM** one of the following:

- 15.14.1 **VENT** CONTAINMENT VESSEL when permission is granted as follows:

- 15.14.1.1 **VERIFY** filter cap is removed and carbon-retaining collar is tightly screwed onto waste drum filter.
- 15.14.1.2 **VERIFY** VESSEL WASTE DRUM HOSE is connected from QD1 to drum 1 and WASTE DRUM VENT HOSE is connected between drums 1 and 2.
- 15.14.1.3 **VERIFY** valve 29 is OPEN to "D1" position (white arrow on lever points to D1) and **CLOSE** valve 38.
- 15.14.1.4 **PREPARE** to vent CONTAINMENT VESSEL by opening valve 18. Slowly **OPEN** valve 19 to avoid compromising waste drum integrity.
- 15.14.1.5 **CLOSE** valve 18 after vessel achieves atmospheric pressure.
- 15.14.1.6 **PROCEED** to Step 16.0.

- 15.14.2 **OPEN** CONTAINMENT VESSEL door when directed as follows:

- 15.14.2.1 **PERFORM** Steps 14.0 through 14.8.2 to open CONTAINMENT VESSEL door to inspect sealing surfaces and then **PROCEED** to Step 15.14.2.2.
- 15.14.2.2 **PERFORM** Steps 1.0 through 5.3 to close CONTAINMENT VESSEL door and then **PROCEED** to Step 15.14.2.3.
- 15.14.2.3 **REPEAT** leak test procedures by performing Steps 15.0 through 15.14.

16.0 **TURN OFF HELIUM LEAK DETECTOR** as follows:

- 16.1 **PRESS** the Cycle Control button (12 in Figure 9-3) on helium detector to isolate the leak detector and **RELEASE** pressure from leak detector by pressing Venting Control button (18 in Figure 9-3).
- 16.2 **RELEASE** LEAK DETECTOR HOSE LD from V-F fitting on right side of HIGH VOLTAGE FLANGE and **PLACE** blank V-F cover over vacuum inlet. **CONNECT** hose to Docking Station.
- 16.3 **PRESS** the Cycle Control button (12 in Figure 9-3) and let leak detector go through a complete vacuum cycle. Cycle is complete when Gross Leak Ready light (9 in Figure 9-3) or Fine Leak Ready light (10 in Figure 9-3) illuminates.
- 16.4 **DEACTIVATE** remaining active buttons on HELIUM LEAK DETECTOR and **TURN OFF** leak detector.
- 16.5 **CLOSE** all valves on CONTAINMENT VESSEL door. **CLOSE** valve 38.
- 16.6 **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station. **RECORD** time leak test completed.

**CALLOUT:** Announce time leak test completed.

17.0 **RETURN** to Step 10.0.

SPECIAL REQUIREMENTS:

1. PPE is to be worn IAW the HASP and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Helium cylinder	as required
Vacuum flex hoses	as required
Primary tool kit	1 each
Pressure regulator assembly	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Vapor sample valve assembly	1 each
Liquid sample valve assembly	1 each
Tedlar® bag sample valve assembly	1 each

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## PROCEDURE 10 DETONATE MUNITION

The purpose of this procedure is to destroy any explosive components and access the chemical fill in a munition.

### PRECONDITIONS:

1. Helium leak test has been completed and was successful.
2. All valves must be closed on valve panel and containment vessel door.
3. All nonessential personnel have cleared the area.
4. Notification of impending detonation must be communicated to all required officials.
5. Air monitoring must be operational.
6. Setup and daily operational checklists have been completed.

### 1.0 **PERFORM FIRING SYSTEM** continuity check as follows:

#### **WARNINGS**

**WHEN NOT BEING USED IN FIRING SYSTEM, FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES. THE SECOND SAFETY INTERLOCK PLUG IS KEPT IN THE COMMAND POST. FAILURE TO MAINTAIN POSITIVE CONTROL OF SAFETY INTERLOCK PLUG MAY RESULT IN UNAUTHORIZED DETONATION.**

**FAILURE TO ASSURE ALL PERSONNEL HAVE CLEARED THE AREA PRIOR TO DETONATION MAY RESULT IN INJURY OR DEATH.**

- 1.1 **ASSURE** Fireset Operator has possession of SAFETY INTERLOCK PLUG.
- 1.2 **ASSURE** four detonator cables (CH1 through CH4) located on the inside of the left-side panel of FIRING SYSTEM CASE are connected to the connectors on the backside of the TEST INTERFACE CHASSIS (CH1 through CH4).

- 1.3 **ASSURE** four 4-foot detonator cables located in SHORTING CONNECTORS compartment are connected to SHORTING CONNECTORS (CH1 through CH4) on front face panel of TEST INTERFACE CHASSIS.
- 1.4 **REMOVE** EXTERIOR DETONATOR SHORTING JACK from HIGH VOLTAGE FLANGE.

**Note**

**Maintain numerical sequence of 50-foot detonator cables with numerical sequence of FIRESET CDU (CH1 through CH4). (See Figure 10-1.)**

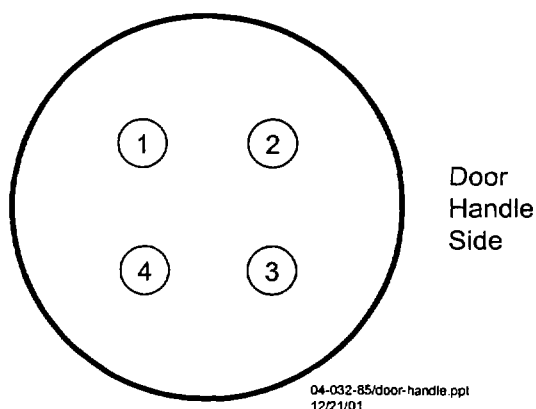


Figure 10-1. High Voltage Flange Exterior View

- 1.5 **CONNECT** EXTERIOR DETONATOR JACK on HIGH VOLTAGE FLANGE in sequence: CH1 to CH1, CH2 to CH2, etc.

**Note**

**When only three exploding bridge wire detonators are connected to the interior detonator jack, all detonator cables MUST be connected to the exterior detonator jack. The exterior detonator jack will be connected IAW the SOP to the high voltage flange. During continuity checks, one of the four detonator cables will read "OPEN" when checked.**

- 1.6 The Team Leader will **VERIFY** the connections in sequence of each detonator cable attached to the feedthroughs IAW Figure 10-1.



- 1.7 **VERIFY** valves 21, 23, and 26 are CLOSED.

**Note**

The control cable comes in four different lengths (12-inch, 29-inch internal, 30-foot, and 300-foot). System continuity checks should be conducted with the same control cable that will be used during munition detonation.

- 1.8 If not already connected, **CONNECT** appropriate interface control cable to FIRING SYSTEM between CONTROL MODULE J3B OUTPUT connector and mating connector located externally on the left side of the FIRING SYSTEM CASE.

**CALLOUT:** Announce which Fire Set is being used.

- 1.9 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 1.10 **TOGGLE** one of two LOAD CONTINUITY meter switches to ON.
- 1.11 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter.
- 1.12 **DISCONNECT** 4-foot detonator cable from CH1 on SHORTING CONNECTORS PANEL located on TEST INTERFACE CHASSIS and **CONNECT** to selected LOAD CONTINUITY meter.

**Note**

In the following step, acceptable meter display reading is no greater than 030 (30 mΩ).

- 1.13 **VERIFY** load continuity.

**CALLOUT:** Announce ohm values obtained for CH1 through CH4.

- 1.14 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY meter and **CONNECT** to CH1 on CDU MODULE.
- 1.15 **REPEAT** Steps 1.12 through 1.14 for remaining detonator cables (CH2 through CH4) and then **PROCEED** to Step 1.16.

- 1.16 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 1.17 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 2.0 **PERFORM** explosives firing sequence as follows:
  - 2.1 **OBTAIN** permission to proceed with firing sequence. **COORDINATE** detonation time with Monitoring personnel, if required.
  - 2.2 **INSERT** SAFETY INTERLOCK PLUG into INTERLOCK connector on TEST INTERFACE CHASSIS.
  - 2.3 **ASSURE** TRIGGER and CDU BITE indicators are set to black position. Gently **TURN** dial clockwise until indicators are set to black.

**Note**

**Steps 2.4 through 2.6 are performed only when removing detachable control module from Firing System chassis.**

- 2.4 **VERIFY** CONTROL MODULE operability by toggling POWER switch to ON position. **OBSERVE** illumination of red light-emitting diode HIGH VOLTAGE meter and green POWER light.
- 2.5 **TOGGLE** CONTROL MODULE POWER switch to OFF.

**Note**

**Front cover of Firing System Case may be attached to prevent contamination or during operation in inclement weather.**

- 2.6 If necessary, **REMOVE** detachable CONTROL MODULE from FIRING SYSTEM CHASSIS by turning wire knobs 1/4-turn in counterclockwise direction and **MOVE** to designated firing position.

**CALLOUT: Obtain permission to fire.**

- 2.7 **TOGGLE** CONTROL MODULE POWER switch to ON position. **OBSERVE** illumination of red light-emitting diode HIGH VOLTAGE meter and green POWER light.

**WARNING**

**AN ELECTRICAL SHOCK HAZARD POTENTIAL EXISTS DURING FOLLOWING PROCEDURE. TRAILER MUST BE CLEARED OF ALL PERSONNEL AND CONTACT WITH EXPOSED METAL PARTS MUST BE AVOIDED. FAILURE TO COMPLY MAY RESULT IN INJURY.**

- 2.8 **TOGGLE** ARM switch on CONTROL MODULE to ON position, and **OBSERVE** that amber READY light and red ARM light illuminates.

**CALLOUT:** Announce countdown when fire switch is released in next step.

- 2.9 To fire, **TOGGLE UP** and **RELEASE** FIRE switch on CONTROL MODULE and **OBSERVE**:

2.9.1 Amber READY light should momentarily flash OFF and then back ON.

2.9.2 Blue FIRE light illuminates.

- 2.10 **CLOSE** cover on FIRE, ARM, and POWER switches.

- 2.11 **COORDINATE** with Monitoring, if required. **MOVE** back to EDS FIRING SYSTEM and **PERFORM** one of the following:

2.11.1 **PROCEED** to Step 3.0 when firing sequence is successful.

2.11.2 **PROCEED** to Step 6.0 in the event of a misfire or no-fire.

- 3.0 **PERFORM** EDS FIRING SYSTEM shutdown as follows:

3.1 **TOGGLE** POWER switch on CONTROL MODULE to ON.

3.2 **VERIFY** that voltage on HIGH VOLTAGE meter achieved 0.00 volts.

3.3 **TOGGLE** POWER switch to OFF on CONTROL MODULE.

3.4 If necessary, **RE-INSTALL** detachable CONTROL MODULE in FIRING SYSTEM CHASSIS.

3.5 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.

**WARNING**

**FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO MAINTAIN POSITIVE CONTROL OF SAFETY INTERLOCK PLUG MAY RESULT IN UNAUTHORIZED DETONATION.**

- 3.6 **REMOVE** SAFETY INTERLOCK PLUG from TEST INTERFACE CHASSIS.
  - 3.7 **DISCONNECT** four 4-foot detonator cables from CDU MODULE CH1 through CH4 and **CONNECT** to CH1 through CH4 on SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
  - 3.8 **REPLACE** dust caps on CH1 through CH4 CDU MODULE connectors on FIRING SYSTEM CHASSIS.
  - 3.9 **REMOVE** EXTERIOR DETONATOR JACK from high voltage feedthrough plugs located on outside of HIGH VOLTAGE FLANGE and **INSTALL** EXTERIOR DETONATOR SHORTING JACK.
  - 3.10 **DISCONNECT** four 50-foot detonator cables from EXTERIOR DETONATOR JACK and **REPLACE** dust caps on four 50-foot detonator cables.
  - 3.11 **MOVE** 50-foot detonator cables and EXTERIOR DETONATOR JACK to a safe location.
  - 4.0 **MONITOR** CONTAINMENT VESSEL pressure as follows:
    - 4.1 **OPEN** valve 23.
    - 4.2 **MONITOR** and **RECORD** CONTAINMENT VESSEL pressure and temperature on VESSEL CONTROL PANEL.
- CALLOUT: Announce containment vessel pressure and temperature. Obtain permission to treat chemical fill.**
- 5.0 **PROCEED** to Procedure 11 to collect initial vapor and/or liquid samples or to Procedure 12 to chemically treat EDS CONTAINMENT VESSEL contents.

# **ALTERNATE PROCEDURE**

6.0 **PERFORM** alternate explosive firing sequence using replacement FIRING SYSTEM as required.

6.1 **RETURN** to and **PERFORM** Procedures 4 and 5 to prepare and test replacement EDS FIRING SYSTEM. Then **PROCEED** to Procedure 10 to perform firing sequence with replacement FIRING SYSTEM.

6.2 **PROCEED** as directed in the event of a misfire or no-fire.

## SPECIAL REQUIREMENTS:

1. PPE is to be worn IAW the HASP and/or at the discretion of the SSHO.

## EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
300-foot interface control cable	1 each
30-foot interface control cable	1 each
12-inch interface control cable	1 each
4-foot detonator cables	4 each
50-foot detonator cables	4 each
Exterior detonator jack	1 each
Exterior detonator shorting jack	1 each
Dust caps (blue-dot)	8 each
Firing System	2 each
Safety interlock plug	2 each
EDS operator log	1 each
Indelible ink pen	1 each

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## **PROCEDURE 11**

### **COLLECT INITIAL VAPOR AND LIQUID SAMPLES**

The purpose of this procedure is to obtain a vapor and liquid sample of chemical agent material.

#### **PRECONDITIONS:**

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and has necessary tools for working with sample valve assemblies.
  2. Receipt of samples has been coordinated with laboratory and courier.
  3. Waste drums must be in place, filters are installed, and drain hoses are in place.
  4. Air monitoring must be operational.
  5. Setup and daily startup checklists must be complete.
  6. Decontaminant and water pails must be positioned on EDS Trailer and sample table.
- 1.0 **ASSURE** sample valve assemblies are installed. **INSTALL** sample valve assemblies IAW Procedure 9, Steps 11.0 and 12.0, as required.

**CALLOUT:** Announce vapor and liquid sample valve assembly numbers. Assure Monitoring gets applicable sample numbers.

- 2.0 **EVACUATE** vapor and/or liquid sample lines.
- 2.1 **PERFORM** one of the following:
- 2.1.1 **PROCEED** to Step 2.2 to evacuate vapor sample line.
  - 2.1.2 **PROCEED** to Step 2.3 to evacuate liquid sample line.
  - 2.1.3 **PROCEED** to Step 2.2 to evacuate vapor sample line when collecting vapor and liquid samples.
- 2.2 **EVACUATE** vapor sample line as follows:
- 2.2.1 **CONNECT** vacuum hose QV to Q19. **VERIFY** valves 21, 22, and 26 are CLOSED.

- 2.2.2 **OPEN** valves 41 and 19.
- 2.2.3 **PUSH** green VACUUM PUMP ON button on PROCESS CONTROL panel and **RUN** vacuum pump until at least -20 inches of mercury (Hg) is displayed on vacuum gauge to evacuate sample line.
- 2.2.4 **CLOSE** valves 19 and 41.
- 2.2.5 **OPEN** valve 42 and then **CLOSE** valve 42.
- 2.2.6 **PUSH** red VACUUM PUMP OFF button. **DISCONNECT** vacuum hose QV from Q19 and **CONNECT** it to Docking Station.
- 2.2.7 **PERFORM** one of the following:
  - 2.2.7.1 When collecting only a vapor sample, **PROCEED** to Step 2.2.8.
  - 2.2.7.2 When collecting liquid and vapor samples, **PROCEED** to Step 2.3.
- 2.2.8 **RECORD** time vapor sample line evacuated and then **PROCEED** to Step 3.0.
- 2.3 **EVACUATE** liquid sample line as follows:
  - 2.3.1 **CONNECT** vacuum hose QV to Q24. **VERIFY** valves 21, 22, and 26 are CLOSED.
  - 2.3.2 **OPEN** valves 41 and 24.
  - 2.3.3 **PUSH** green VACUUM PUMP ON button on PROCESS CONTROL panel and **RUN** vacuum pump until at least -20 inches of mercury (Hg) is displayed on vacuum gauge to evacuate sample line.
  - 2.3.4 **CLOSE** valves 24 and 41.
  - 2.3.5 **OPEN** valve 42 and then **CLOSE** valve 42.
  - 2.3.6 **PUSH** red VACUUM PUMP OFF button, **DISCONNECT** vacuum hose QV from Q24, and **CONNECT** vacuum hose QV to Docking Station.



2.3.7 **RECORD** time sample line(s) evacuated and **PERFORM** one of the following:

2.3.7.1 When collecting only a liquid sample, **PROCEED** to Step 4.0.

2.3.7.2 When collecting liquid and vapor samples, **PROCEED** to Step 3.0.

3.0 **COLLECT** vapor sample as follows:

**WARNING**

**FAILURE TO ASSURE ALL VALVES, EXCEPT VALVE 23, ON CONTAINMENT VESSEL DOOR ARE CLOSED MAY CAUSE CHEMICAL AGENT TO BE DUMPED INTO WASTE DRUM OR INTO ENVIRONMENT.**

3.1 **VERIFY** that all valves on CONTAINMENT VESSEL door are CLOSED except valve 23.

3.2 **RECORD** CONTAINMENT VESSEL pressure and temperature.

**CALLOUT:** Announce containment vessel pressure and temperature.

**Note**

**Monitor sample valve assembly IAW local monitoring program.**

3.3 **OPEN** valve 21.

3.4 **OPEN** valve 20 (25-milliliter [mL] vapor sample valve assembly).

3.5 Tightly **CLOSE** valve 20.

3.6 **PERFORM** one of the following:

3.6.1 **PROCEED** to Step 5.0 to decontaminate and rinse vapor sample line when collecting only a vapor sample.

3.6.2 **PROCEED** to Step 4.0 to collect a liquid sample.

4.0 **COLLECT** liquid sample as follows:

4.1 **OPEN** valve 26.

**Note**

**Monitor sample valve assembly IAW local monitoring program.**

4.2 **OPEN** valve 25 (25-mL liquid sample valve assembly).

4.3 Tightly **CLOSE** valve 25.

4.4 **PERFORM** one of the following:

4.4.1 **PROCEED** to Step 6.0 to decontaminate and rinse liquid sample line when only a liquid sample was collected.

4.4.2 **PROCEED** to Step 5.0 to decontaminate and rinse vapor sample line when vapor and liquid samples were collected.

5.0 **DECONTAMINATE** and **RINSE** vapor sample line as follows:

**WARNING**

**FAILURE TO PERFORM THE FOLLOWING SAMPLE LINE RINSE PROCEDURES AFTER COLLECTING A VAPOR SAMPLE MAY RESULT IN A CHEMICAL AGENT RELEASE FROM SAMPLE LINES AND CONTAINMENT VESSEL.**

5.1 **CONNECT** supply hose QS to Q19.

5.2 **OPEN** valve 17.

5.3 **START** REAGENT SUPPLY PUMP by opening valve 57.

5.3.1 **PROCEED** to Step 5.4 when supply pump is operating.

5.3.2 **PROCEED** to Step 12.1 when the supply pump is not operating correctly.

- 5.4 **OPEN** valve 19 to decontaminate vapor sample line, and **WAIT** 15 seconds.
- 5.5 **OPEN** valves 15 and 56. **CLOSE** valves 17 and 57. **WAIT** 15 seconds.
  - 5.5.1 **PROCEED** to Step 5.6 when supply pump is operating.
  - 5.5.2 **PROCEED** to Step 12.3 when the supply pump is not operating correctly.
- 5.6 **CLOSE** valves 19 and 21. **CLOSE** valves 15 and 56.
- 5.7 **VERIFY** valve 37 is **CLOSED**. Slowly **OPEN** valve 18 to drain supply hose. **CLOSE** valve 18.
- 5.8 **PERFORM** one of the following:
  - 5.8.1 **PROCEED** to Step 7.0 to flush vapor sample line with helium when only a vapor sample was collected.
  - 5.8.2 **PROCEED** to Step 6.0 to decontaminate and rinse liquid sample line when vapor and liquid samples were collected.

6.0 **DECONTAMINATE** and **RINSE** liquid sample line as follows:

**WARNING**

**FAILURE TO PERFORM THE FOLLOWING SAMPLE LINE RINSE PROCEDURES AFTER COLLECTING A LIQUID SAMPLE MAY RESULT IN A CHEMICAL AGENT RELEASE FROM SAMPLE LINES AND CONTAINMENT VESSEL.**

- 6.1 **CONNECT** supply hose QS to Q24.
- 6.2 **OPEN** valve 17.
- 6.3 **START** REAGENT SUPPLY PUMP by opening valve 57.
  - 6.3.1 **PROCEED** to Step 6.4 when supply pump is operating.
  - 6.3.2 **PROCEED** to Step 12.2 when the supply pump is not operating correctly.

- 6.4 **OPEN** valve 24 to decontaminate liquid sample line, and **WAIT** 15 seconds.
- 6.5 **OPEN** valves 15 and 56. **CLOSE** valves 57 and 17.
  - 6.5.1 **PROCEED** to Step 6.6 when supply pump is operating.
  - 6.5.2 **PROCEED** to Step 12.4 when the supply pump is not operating correctly.
- 6.6 **WAIT** 15 seconds. **CLOSE** valves 26 and 24. **CLOSE** valves 15 and 56.
- 6.7 **VERIFY** valve 37 is CLOSED. Slowly **OPEN** valve 18 to drain supply hose. **CLOSE** valve 18.
- 6.8 **PERFORM** one of the following:
  - 6.8.1 After collecting vapor and liquid samples, **DISCONNECT** supply hose QS from Q24 and **CONNECT** it to Q19. **PROCEED** to Step 7.0.
  - 6.8.2 After collecting only a liquid sample, **PROCEED** to Step 7.2 to flush liquid sample line with helium.
- 7.0 **FLUSH** sample line(s) with helium as follows:
  - 7.1 **FLUSH** vapor sample line.
    - 7.1.1 **VERIFY** supply hose QS is connected to Q19.
    - 7.1.2 **OPEN** valve 16 and then **OPEN** valve 19.

**Note**

**In Step 7.1.3, valve is opened one turn (until gas is heard venting into the containment vessel) and then immediately closed.**

- 7.1.3 **OPEN** valve 21 one turn, **CLOSE** valve 21, and **CLOSE** valve 16.
- 7.1.4 **VERIFY** valve 37 is CLOSED. **VERIFY** 29 is OPEN to "D1" position (white arrow on lever points to D1).
- 7.1.5 Slowly **OPEN** valve 18 until pressure is vented.
- 7.1.6 **CLOSE** valves 19 and 18.

7.1.7 **PERFORM** one of the following:

7.1.7.1 After collecting vapor and liquid samples, **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Q24. **PROCEED** to Step 7.2 to flush liquid sample line.

7.1.7.2 After having to flush only vapor sample line, **PROCEED** to Step 8.0 to remove valve 20 (vapor sample valve assembly).

7.2 **FLUSH** liquid sample line as follows:

7.2.1 **VERIFY** supply hose QS is connected to Q24.

7.2.2 **OPEN** valves 16 and 24.

**Note**

In Step 7.2.3, valve is opened one turn (until gas is heard venting into the containment vessel) and then immediately closed.

7.2.3 **OPEN** valve 26 one turn. **CLOSE** valve 26 and **CLOSE** valve 16.

7.2.4 **VERIFY** valve 37 is CLOSED. **VERIFY** 29 is OPEN to "D1" position (white arrow on lever points to D1).

7.2.5 Slowly **OPEN** valve 18 until pressure is vented.

7.2.6 **CLOSE** valves 24 and 18.

7.2.7 **DISCONNECT** supply hose QS from Q24 and **CONNECT** it to the Docking Station.

8.0 **REMOVE** sample valve assembly. **PROCEED** to Step 8.1 to remove a vapor sample valve assembly or **PROCEED** to Step 8.2 to remove a liquid sample valve assembly.

8.1 **REMOVE** valve 20 (vapor sample valve assembly) as follows:

8.1.1 **VERIFY** valve 21 is CLOSED. **NOTIFY** monitoring personnel of potential release.

8.1.2 **SECURE** valve 20 body with a 3/4-inch open-end wrench to hold valve body.

- 8.1.3 **LOOSEN** the fittings on both sides of valve 20 using a 5/8-inch open-end wrench. **VERIFY** valve 21 is tightly CLOSED.
- 8.1.4 **LOOSEN** handle securing valve 19, and **SLIDE** valve 19 to the left, away from valve 20.
- 8.1.5 **REMOVE** valve 20 from sample line.

**CALLOUT:** Announce time vapor sample valve assembly removed from containment vessel door.

- 8.1.6 **RECORD** time valve 20 removed from CONTAINMENT VESSEL door.
- 8.1.7 **PERFORM** one of the following:
  - 8.1.7.1 **PROCEED** to Step 9.0 for packaging and transport procedures when only a vapor sample was collected.
  - 8.1.7.2 **PROCEED** to Step 8.2 when vapor and liquid samples were collected.

8.2 **REMOVE** valve 25 (liquid sample valve assembly) as follows:

- 8.2.1 **VERIFY** valve 26 is CLOSED. **NOTIFY** monitoring personnel of potential release.
- 8.2.2 **SECURE** valve 25 body with 3/4-inch open-end wrench to hold valve body.
- 8.2.3 **LOOSEN** fittings on both sides of valve 25 using 5/8-inch open-end wrench. **VERIFY** valve 26 is tightly CLOSED.
- 8.2.4 **LOOSEN** handle securing valve 24, and **SLIDE** valve 24 to the left, away from valve 25.
- 8.2.5 **REMOVE** valve 25 from sample line.

**CALLOUT:** Announce time liquid sample valve assembly removed from containment vessel door.

- 8.2.6 **RECORD** time valve 25 removed from CONTAINMENT VESSEL door.

9.0 **PREPARE** sample valve assembly(s) for transport as follows:

- 9.1 **PLACE** pipe plug and lab adapter into valve openings of sample valve(s).

- 9.2 **SECURE** sample valve assembly(s) in a vise and **TIGHTEN** both fittings to 30 ft-lbs using the appropriate torque wrench.
- 9.3 **PLACE** sample valve assembly(s) into pail of decontaminant.
- 9.4 **REMOVE** sample valve assemblies from decontaminant pail and **PLACE** into rinse pail of water.
- 9.5 **REMOVE** sample valve assembly(s) from rinse pail.
- 9.6 **PACK** sample valve assembly(s) into separate secondary containers or sample bags.

**Note**

**Monitor item IAW local monitoring program.**

- 9.7 **MONITOR** exterior of sample valve assembly(s) to assure it is below criteria for permissible exposure levels. **RECORD** monitoring results.
- 9.8 **PLACE** packaged sample(s) into overpack(s) containing absorbent material. **CARRY** overpacked sample valve assembly(s) to the PDS.
- 9.9 **COMPLETE** required chain-of-custody documents (see Annex A, Figures A-3 and A-4).
- 9.10 **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.
- 10.0 **INSTALL** replacement sample valve assemblies IAW Procedure 9, Steps 11.0 and 12.0, as required.
- 11.0 **PROCEED** to Procedure 12.

**ALTERNATE PROCEDURE:**

- 12.0 If necessary, **IMPLEMENT** alternate pump procedure as follows:
  - 12.1 **DECONTAMINATE** and **RINSE** vapor sample line using WATER SUPPLY PUMP as follows:
    - 12.1.1 **CLOSE** valves 17 and 57. **CLOSE** valve 8 to close water transfer line.

- 12.1.2 **OPEN** valves 12 and 9 to route reagent to WATER SUPPLY PUMP.
- 12.1.3 **OPEN** valves 56 and 15.
- 12.1.4 **OPEN** valve 19 and **WAIT** 15 seconds.
- 12.1.5 **CLOSE** valves 21 and 19. **CLOSE** valves 15 and 56.
- 12.1.6 **CLOSE** valves 12 and 9 to close reagent lines to WATER SUPPLY PUMP.
- 12.1.7 **OPEN** valve 8 to route water to WATER SUPPLY PUMP.
- 12.1.8 **OPEN** valves 56 and 15.
- 12.1.9 **OPEN** valves 19 and 21. **WAIT** 15 seconds.
- 12.1.10 **CLOSE** valves 21 and 19. **CLOSE** valves 15 and 56.
- 12.1.11 **RETURN** to Step 5.7.
- 12.2 **DECONTAMINATE** and **RINSE** liquid sample line using WATER SUPPLY PUMP as follows:
  - 12.2.1 **CLOSE** valves 17 and 57. **CLOSE** valve 8 to close water transfer line.
  - 12.2.2 **OPEN** valves 12 and 9 to route reagent to WATER SUPPLY PUMP.
  - 12.2.3 **OPEN** valves 56 and 15.
  - 12.2.4 **OPEN** valve 24 and **WAIT** 15 seconds.
  - 12.2.5 **CLOSE** valves 26 and 24. **CLOSE** valves 15 and 56.
  - 12.2.6 **CLOSE** valves 12 and 9 to close reagent lines to WATER SUPPLY PUMP.
  - 12.2.7 **OPEN** valve 8 to route water to WATER SUPPLY PUMP.
  - 12.2.8 **OPEN** valves 56 and 15.
  - 12.2.9 **OPEN** valves 24 and 26. **WAIT** 15 seconds.



12.2.10 **CLOSE** valves 26 and 24. **CLOSE** valves 15 and 56.

12.2.11 **RETURN** to Step 6.7.

12.3 **RINSE** vapor sample line using REAGENT SUPPLY PUMP as follows:

12.3.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.

12.3.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.

12.3.3 **OPEN** valves 57 and 17.

12.3.4 **OPEN** valve 19 and **WAIT** 15 seconds.

12.3.5 **CLOSE** valves 21 and 19. **CLOSE** valves 17 and 57.

12.3.6 **CLOSE** valves 12 and 9 to close water lines to REAGENT SUPPLY PUMP.

12.3.7 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.

12.3.8 **RETURN** to Step 5.7.

12.4 **RINSE** liquid sample line using REAGENT SUPPLY PUMP as follows:

12.4.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.

12.4.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.

12.4.3 **OPEN** valves 57 and 17.

12.4.4 **VERIFY** valve 24 and **WAIT** 15 seconds.

12.4.5 **CLOSE** valves 24 and 26. **CLOSE** valves 17 and 57.

12.4.6 **CLOSE** valves 12 and 9 to close water lines to REAGENT SUPPLY PUMP.

12.4.7 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.

12.4.8 **RETURN** to Step 6.7.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE is to be worn IAW the HASP and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Helium tank	as required
Decontaminant pail	2 each
Rinse pail	2 each
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Labeled sample bottles	as required
Sample packaging	as required
Reagent	as required
Liquid waste drums	as required
Open-head drums	as required
Household bleach (5 percent)	as required
Waste bags	as required
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 12

### CHEMICALLY TREAT EDS CONTAINMENT VESSEL CONTENTS

The purpose of this operation is to chemically treat the EDS containment vessel contents with the proper reagent.

#### PRECONDITIONS:

1. Water and proper reagent have been filled into supply tanks 1 and 2 on board trailer.
2. Air monitoring must be operational.
3. Setup and daily startup checklists have been completed.
4. Initial sampling must be complete, if required.
5. Vapor sample has been analyzed or proceed as directed by Site Manager.
6. Air compressor must be operating.

#### 1.0 **TREAT** munition fill according to one of the following criteria:

- 1.1 Assessed chemical fill has been verified by vapor analysis. **PROCEED** to Step 2.0.
- 1.2 **DIRECTED** by Site Manager. **PROCEED** to Step 2.0.
- 1.3 Verified munition fill is not listed in Table 3-1 or unexpected fill encountered. **NOTIFY** EDS Crew Supervisor and **PROCEED** as directed.
- 1.4 PINS data are inconclusive or none are available for munition. **PROCEED** as directed.

#### 2.0 **TRANSFER** amount of chemical reagent/water, as prescribed in Table 3-1 or as directed, from supply tanks into CONTAINMENT VESSEL as follows:

- 2.1 **VERIFY** all valves located on REAGENT SUPPLY PANEL and CONTAINMENT VESSEL are closed, except valves 29, 23, and 52. **CHECK** CONTAINMENT VESSEL pressure.
- 2.2 **VERIFY** supply hose QS is connected to Q19.

- 2.3 **START** appropriate supply pump to commence transfer by performing one of the following:
  - 2.3.1 **START REAGENT SUPPLY PUMP** by opening valves 57 and 17. **PROCEED** as follows:
    - 2.3.1.1 **PROCEED** to Step 2.4 when supply pump is operating correctly.
    - 2.3.1.2 **PROCEED to Step 8.1 when supply pump is not operating correctly.**
  - 2.3.2 **START WATER SUPPLY PUMP** by opening valves 56 and 15. **PROCEED** as follows:
    - 2.3.2.1 **PROCEED** to Step 2.4 when supply pump is operating correctly.
    - 2.3.2.2 **PROCEED to Step 8.2 when the supply pump is not operating correctly.**
- 2.4 **OPEN** valves 19 and 21 to commence transfer of reagent/water into the CONTAINMENT VESSEL. **MONITOR** CONTAINMENT VESSEL pressure throughout reagent transfer.
- 2.5 **TURN OFF** supply tank heaters, if applicable.

**CALLOUT:** Announce time supply tank heaters turned OFF, if applicable.

- 3.0 **STOP** transfer of chemical reagent/water to CONTAINMENT VESSEL as follows:
  - 3.1 **CLOSE** valves 21 and 19 when quantity of chemical reagent/water specified in Table 3-1 has transferred to CONTAINMENT VESSEL.
  - 3.2 **PERFORM** one of the following:
    - 3.2.1 **CLOSE** valves 17 and 57 to stop REAGENT SUPPLY PUMP and then **PROCEED** to Step 3.3.
    - 3.2.2 **CLOSE** valves 15 and 56 to stop WATER SUPPLY PUMP and then **PROCEED** to Step 3.3.
  - 3.3 Slowly **OPEN** valve 18 to vent supply hose. **CLOSE** valve 18.
  - 3.4 **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station.

4.0 **OPERATE ROTARY AGITATION SUBSYSTEM** as follows:

**Note**

**Containment vessel will only stop during normal operations in the HOME or DRAIN position after moving in a clockwise direction.**

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 4.1 **LOWER** Jack Support. **VERIFY** three PROCESS SHUTDOWN buttons are out and red VESSEL ROTATION CONTROL OFF light is illuminated on VESSEL CONTROL PANEL.
- 4.2 **PUSH** green VESSEL ROTATION CONTROL ON button (light illuminates, DRIVE FAULT light illuminates momentarily and then goes out, and red VESSEL ROTATION CONTROL OFF light goes off).
- 4.3 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Docking Stations (Supply Hose, Vacuum Hose, Vessel Effluent Hose, Leak Detector Hose, and Hydraulic Pump Hose).
- 4.4 **VERIFY** LEFT and RIGHT CLAMP INTERLOCKS READY lights are illuminated (clamps and CONTAINMENT VESSEL door are closed).

**Notes**

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

- 4.5 **INSERT** and **TURN** rotation control key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green HOME button, and red HALT light illuminate).
- 4.6 **VERIFY INTERLOCKS** Key switch is set to ON (green READY light is illuminates).

**Note**

Containment vessel will not commence rotating unless all seven interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate if placed in BYPASS mode. Containment vessel will continue to rotate even if one of the docking station positions comes open after rotation commences.

- 4.7 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
  - 4.7.1 **PROCEED** to Step 4.8 when green INTERLOCKS READY light is illuminated.
  - 4.7.2 **PROCEED** to Step 4.7.2.1 when green INTERLOCKS READY light is not illuminated.
    - 4.7.2.1 **CHECK** and **SECURE** all hoses in the Hose Docking Stations. **CHECK CLAMP INTERLOCKS READY** lights are illuminated.
    - 4.7.2.2 **PROCEED** to Step 4.8 when green INTERLOCKS READY light illuminates or to Step 4.7.2.3 when light does not illuminate.
    - 4.7.2.3 **TURN** Interlocks Control Key to BYPASS position (red BYPASS light illuminates). **PROCEED** to Step 4.8.

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

4.8 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).  
**PROCESS** chemical fill IAW Table 3-1.

4.9 **RECORD** rotation start time.

**CALLOUT:** Announce time containment vessel rotation began.

5.0 **TREAT** CONTAINMENT VESSEL contents by performing one of the following:

5.1 **DO NOT TURN ON** CONTAINMENT VESSEL heaters for heat-treating munitions with unknown fills, inconclusive PINS data, or no PINS data unless directed by Site Manager.

5.2 **TURN ON** CONTAINMENT VESSEL heaters, if applicable, IAW Table 3-1 for chemical agent fill encountered as follows:

5.2.1 **VERIFY** setpoint temperature for CONTAINMENT VESSEL heaters is set IAW Table 3-1 and **PROCEED** as follows:

5.2.1.1 When setpoint temperature is IAW Table 3-1,  
**PROCEED** to Step 5.2.2.

5.2.1.2 When setpoint temperature is not IAW Table 3-1,  
**ADJUST** setpoint temperature as needed with setpoint temperature modification arrows located on the VESSEL HEATER CONTROL panel. **PROCEED** to Step 5.2.2.

**WARNING**

**DIRECT CONTACT WITH CONTAINMENT VESSEL HEATERS CAN  
RESULT IN INJURY.**

5.2.2 **PUSH** green VESSEL HEATER CONTROL panel ON button.

**Note**

**When monitoring internal containment vessel temperature and temperature fails to remain within  $\pm 5$  degrees of setpoint, perform immediate action procedure in Annex F to monitor external containment vessel skin temperature.**

- 5.2.3 **MONITOR** temperature to assure CONTAINMENT VESSEL temperature reaches correct temperature for chemical fill IAW Table 3-1 and remains within  $\pm 5$  degrees of setpoint.

**CALLOUT: Announce time containment vessel heaters turned ON.**

- 6.0 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.
- 7.0 **PROCEED** to Procedure 13 to collect treated liquid sample or **PROCEED** to Procedure 14 to drain the CONTAINMENT VESSEL.

**ALTERNATE PROCEDURE:**

- 8.0 If necessary, **IMPLEMENT** alternate pump procedure as follows:
- 8.1 **IMPLEMENT** alternate pump procedure for faulty REAGENT SUPPLY PUMP as follows:
- 8.1.1 **CLOSE** valves 17 and 57. **CLOSE** valve 8 to close water transfer line.
- 8.1.2 **OPEN** valves 12 and 9 to route reagent to WATER SUPPLY PUMP.
- 8.1.3 **COMMENCE** reagent transfer using WATER SUPPLY PUMP by opening valves 56 and 15. **PROCEED** as follows:
- 8.1.3.1 **PROCEED** to Step 8.1.4 when pump is operating correctly.
- 8.1.3.2 **PROCEED** to Step 9.0 when pump is not operating correctly.
- 8.1.4 **OPEN** valves 19 and 21 to commence transfer of reagent into CONTAINMENT VESSEL. **MONITOR** CONTAINMENT VESSEL pressure throughout reagent transfer.
- 8.1.5 **TURN OFF** supply tank heaters, if applicable.



- 8.1.6 **CLOSE** valves 21 and 19 when quantity of chemical reagent specified in Table 3-1 has transferred to CONTAINMENT VESSEL. **CLOSE** valves 15 and 56.
- 8.1.7 **CLOSE** valves 12 and 9 to close reagent lines to WATER SUPPLY PUMP.
- 8.1.8 **OPEN** valve 8 to route water back to WATER SUPPLY PUMP.
- 8.1.9 **RETURN** to Step 3.3.
- 8.2 **IMPLEMENT** alternate pump procedure for faulty WATER SUPPLY PUMP as follows:
  - 8.2.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.
  - 8.2.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.
  - 8.2.3 **OPEN** valves 57 and 17.
  - 8.2.4 **OPEN** valves 19 and 21 to commence transfer of reagent into CONTAINMENT VESSEL. **MONITOR** CONTAINMENT VESSEL pressure throughout reagent transfer.
  - 8.2.5 **ASSURE** CONTAINMENT VESSEL heaters are turned ON, if applicable, IAW Table 3-1 for chemical fill encountered. **TURN OFF** supply tank heaters, if applicable.
  - 8.2.6 **CLOSE** valves 21 and 19 when quantity of water specified in Table 3-1 has transferred to CONTAINMENT VESSEL. **CLOSE** valves 17 and 57.
  - 8.2.7 **CLOSE** valves 12 and 9 to close water lines to REAGENT SUPPLY PUMP.
  - 8.2.8 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.
  - 8.2.9 **RETURN** to Step 3.3.
- 9.0 **IMPLEMENT** alternate pump procedures when supply pumps are not operating or there is no air pressure as follows:
  - 9.1 **VERIFY** valves 9, 12, 15, 17, 18, 19, 21, 56, and 57 are CLOSED.

9.2 **PREPARE** HAND TRUCK PUMP as follows:

- 9.2.1 **POSITION** HAND TRUCK PUMP next to chemical reagent/solvent container.
- 9.2.2 **CONNECT** 3-prong HAND TRUCK PUMP power cord to 30-ampere (amp) electrical outlet (DP4-29) on 120-V Support Distribution Panel.

9.3 **INSTALL** T-connector on REAGENT PLATFORM PANEL as follows:

- 9.3.1 **DISCONNECT** supply hose QS from Q15.
- 9.3.2 **CONNECT** T-connector to Q15 and **CONNECT** supply hose QS to T-connector.
- 9.3.3 **CONNECT** long HAND TRUCK PUMP hose to T-connector and HAND TRUCK PUMP outlet.

9.4 **INSTALL** DRUM PUMP as follows:

- 9.4.1 **REMOVE** large bung plug from chemical reagent/solvent container and **PLACE** DRUM PUMP into container.
- 9.4.2 **CONNECT** DRUM PUMP power cord to trailer electrical outlet.
- 9.4.3 **CONNECT** short HAND TRUCK PUMP hose to DRUM PUMP and HAND TRUCK PUMP inlet.
- 9.4.4 **VERIFY** chemical reagent/solvent container weight.
- 9.4.5 **REQUEST** reagent transfer weight from Command Post.

9.5 **COMMENCE** reagent transfer as follows:

- 9.5.1 **START** DRUM PUMP. **PUSH** green ON button on HAND TRUCK PUMP and **OPEN** valves 19 and 21.
- 9.5.2 **MONITOR** chemical reagent/solvent container scales during transfer.

9.6 **STOP** reagent transfer as follows:

- 9.6.1 **CLOSE** valves 21 and 19.

9.6.2 **PUSH** red OFF button on HAND TRUCK PUMP and **TURN OFF** DRUM PUMP.

9.6.3 **RETURN** to Step 3.3.

SPECIAL REQUIREMENTS:

1. PPE is to be worn IAW the HASP, if applicable and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Vessel rotation control key	1 each
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## **PROCEDURE 13 COLLECT TREATED LIQUID SAMPLE**

The purpose of this procedure is to obtain a liquid sample. If vapor samples are required, see Procedure 16.

### PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and has been provided with the necessary tools for sample valve assemblies.
2. Receipt of samples has been coordinated with laboratory and courier.
3. Waste drums are in place, filters are installed, and drain hoses are in place.
4. Air monitoring must be operational.
5. Setup and daily startup checklists have been completed.
6. Decontaminant pail, water pail, and rags are positioned onto EDS Trailer and sample table.

<b><u>WARNING</u></b>
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<b>DIRECT CONTACT WITH HEATED CONTAINMENT VESSEL CAN CAUSE INJURY.</b>
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- 1.0 **COLLECT** treated liquid sample by performing one of the following:
  - 1.1 **PROCEED** to Step 2.0 to collect sample via CONTAINMENT VESSEL door.
  - 1.2 **PROCEED** to Procedure 14, Step 1.1 to collect sample via valve 28 or from waste drums.

2.0 **STOP** ROTARY AGITATION SUBSYSTEM as follows:

- 2.1 **VERIFY** CONTAINMENT VESSEL heaters are OFF. **PUSH** red VESSEL HEATER CONTROL OFF button on VESSEL HEATER CONTROL PANEL to turn CONTAINMENT VESSEL heaters OFF.
- 2.2 **PUSH** green Vessel Rotation Control HOME button to stop CONTAINMENT VESSEL rotation and to automatically return CONTAINMENT VESSEL to HOME position (HOME button illuminates and red HALT button illuminates after HOME position is reached).
- 2.3 **TURN** Vessel Rotation Control Key to OFF position and **REMOVE** Vessel Rotation Control Key.
- 2.4 **RECORD** rotation stop time.

**CALLOUT:** Announce time rotation halted.

3.0 **CLEAR** liquid sample line with helium as follows:

- 3.1 **CONNECT** supply hose QS to Q24, and **OPEN** valves 16 and 24. **VERIFY** valve 23 is open.

**Note**

**In Step 3.2, valve 26 is opened one turn and immediately closed.**

- 3.2 **OPEN** valve 26 one turn and immediately **CLOSE** valve 26.
  - 3.3 **CLOSE** valve 16.
  - 3.4 Slowly **OPEN** valve 18 to relieve pressure.
  - 3.5 **CLOSE** valves 24 and 18.
- 4.0 **EVACUATE** liquid sample line as follows:
- 4.1 **DISCONNECT** supply hose QS from Q24 and **CONNECT** it to Docking Station. **CONNECT** vacuum hose QV to Q24.
  - 4.2 **OPEN** valves 41 and 24.
  - 4.3 **PUSH** green VACUUM PUMP ON button on PROCESS CONTROL PANEL and **RUN** vacuum pump until at least -20 inches of mercury (Hg) is displayed on VACUUM GAUGE.

- 4.4 **CLOSE** valves 24 and 41.
- 4.5 **OPEN** valve 42 and then **CLOSE** valve 42.
- 4.6 **PUSH** red VACUUM PUMP OFF button. **DISCONNECT** vacuum hose QV from Q24 and **CONNECT** it to Docking Station.

5.0 **COLLECT** liquid sample as follows:

- 5.1 **RECORD** CONTAINMENT VESSEL pressure and temperature.

**CALLOUT:** Announce containment vessel pressure and temperature.

- 5.2 **CONNECT** supply hose QS to Q24, and **OPEN** valve 26.
- 5.3 **OPEN** valve 25 to collect liquid sample.
- 5.4 Tightly **CLOSE** valve 25.

6.0 **DECONTAMINATE** and **RINSE** sample line as follows:

- 6.1 **START** REAGENT SUPPLY PUMP by opening valves 57 and 17.
  - 6.1.1 **PROCEED** to Step 6.2 when supply pump is operating correctly.
  - 6.1.2 **PROCEED** to Step 15.1 when the supply pump is not operating correctly.
- 6.2 **OPEN** valve 24, and **WAIT** 15 seconds (reagent). **CLOSE** valve 26.
- 6.3 **CLOSE** valves 17 and 57. **OPEN** valves 56 and 15.
  - 6.3.1 **PROCEED** to Step 6.4 when supply pump is operating correctly.
  - 6.3.2 **PROCEED** to Step 15.2 when the supply pump is not operating correctly.
- 6.4 **OPEN** valve 26. **WAIT** 15 seconds (water).
- 6.5 **CLOSE** valve 26 and **STOP** water transfer by closing valves 15 and 56.
- 6.6 **VERIFY** valve 37 is CLOSED. **VERIFY** 29 is OPEN to "D1" position (white arrow on lever points to D1).
- 6.7 **OPEN** valve 16 to flush sample line with helium.

**Note**

**In Step 6.8, valve is opened one turn (until gas is heard venting into containment vessel) and then immediately closed.**

- 6.8 **OPEN** valve 26 one turn. **LISTEN** for gas venting, and **CLOSE** valve 26 immediately.
- 6.9 **CLOSE** valve 16.
- 6.10 Slowly **OPEN** valve 18 to release pressure.
- 6.11 **CLOSE** valves 24 and 18.
- 6.12 **DISCONNECT** supply hose QS from Q24 and **CONNECT** supply hose QS to Docking Station.
- 7.0 **REMOVE** valve 25 from sample line as follows:
  - 7.1 **VERIFY** valve 26 is CLOSED, and **NOTIFY** Monitoring personnel of a possible release.
  - 7.2 **SECURE** valve 25 body with a 3/4-inch open-end wrench and **LOOSEN** the fittings on both sides of valve assembly using a 5/8-inch open-end wrench.
  - 7.3 **VERIFY** valve 26 is tightly CLOSED. **LOOSEN** handle securing valve 24, and **SLIDE** valve 24 to the left, away from valve 25.
  - 7.4 **REMOVE** valve 25 from sample line, and **RECORD** time valve 25 is removed.

**CALLOUT: Announce time valve 25 is removed from containment vessel door.**

- 8.0 **PREPARE** valve 25 for transport as follows:
  - 8.1 **PLACE** pipe plug and lab adapter into valve openings of valve 25.
  - 8.2 **SECURE** valve 25 in a vise, and **TIGHTEN** both fittings to 30 ft-lbs using the appropriate torque wrench.
  - 8.3 **PLACE** valve 25 into pail of decontaminant.
  - 8.4 **REMOVE** valve 25 from decontaminant pail and **PLACE** in rinsewater pail.
  - 8.5 **REMOVE** valve 25 from rinse pail, and **PACK** into a separate secondary container or sample bag.



**Note**

**Monitor item IAW local monitoring program.**

- 8.6 **MONITOR** exterior of valve 25 to assure it is below criteria for permissible exposure levels. **RECORD** monitoring results.
- 8.7 **PLACE** packaged valve 25 into overpack containing absorbent material, **SEAL** overpack, and **CARRY** overpacked valve 25 to the PDS.
- 8.8 **COMPLETE** required chain-of-custody documents (see Annex A, Figures A-3 and A-4).
- 8.9 **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.
- 9.0 **INSTALL** new liquid sample valve assembly IAW Procedure 9, Step 12.0 and then **PROCEED** to Step 10.0.
- 10.0 **PERFORM** one of the following:
  - 10.1 **PROCEED** to Step 12.0 when munition treatment is complete.
  - 10.2 **PROCEED** to Procedure 15, Step 3.1 to start CONTAINMENT VESSEL rinsate drain.

- 10.3 **START** ROTARY AGITATION SUBSYSTEM when treatment is not complete as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 10.3.1 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch and **TURN** Rotation Control Key to AUTO position (green AUTO READY light illuminates and red HALT button illuminates).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 10.3.2 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATION button illuminates and red HALT button goes off).

- 10.3.3 **RECORD** CONTAINMENT VESSEL rotation start time.

**CALLOUT: Announce time CONTAINMENT VESSEL rotation started.**

- 10.3.4 **TURN ON** CONTAINMENT VESSEL heaters, if applicable, IAW Table 3-1 for chemical agent fill encountered as follows:

**WARNING**

**DIRECT CONTACT WITH CONTAINMENT VESSEL HEATERS CAN RESULT IN INJURY.**

- 10.3.4.1 **PUSH** green Vessel Heater Control ON button on VESSEL CONTROL PANEL.

**Note**

**When monitoring internal containment vessel temperature and temperature fails to remain within  $\pm 5$  degrees of setpoint, perform immediate action procedure in Annex F to monitor external containment vessel skin temperature.**

- 10.3.4.2 **MONITOR** temperature to assure CONTAINMENT VESSEL temperature reaches correct temperature for chemical fill IAW Table 3-1 and remains within  $\pm 5$  degrees of setpoint.

**CALLOUT:** Announce time containment vessel heaters turned ON.

- 11.0 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.

- 12.0 **PROCESS** munition as follows:

- 12.1 **PROCEED** to Step 13.0 when treatment is complete and no further treated liquid samples via the CONTAINMENT VESSEL door are required.

- 12.2 **COLLECT** subsequent treated liquid samples during treatment time as follows:

- 12.2.1 **RETURN** to Step 1.0 and **PERFORM** Steps 1.1 through 12.0 for each required sample.

- 12.2.2 **PROCEED** to Step 13.0 when no further liquid samples are required.

13.0 **CONCLUDE** treatment time as follows:

13.1 **START ROTARY AGITATION SUBSYSTEM** as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

13.1.1 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch and **TURN** Rotation Control Key to AUTO position (green AUTO READY light illuminates and red HALT button illuminates).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

13.1.2 **PUSH** ROTATE button and then DRAIN button on VESSEL ROTATION CONTROL PANEL to place CONTAINMENT VESSEL in drain position.

13.1.3 **TURN OFF** and **REMOVE** Rotation Control Key.

**CALLOUT: Announce time containment vessel rotation stopped.**

13.2 **CLOSE** all valves on REAGENT SUPPLY PANEL and CONTAINMENT VESSEL door (valves 23, 29, and 52 remain OPEN).

14.0 **PROCEED** to Procedure 14 (Remove Liquid Waste from EDS Containment Vessel).

**ALTERNATE PROCEDURE:**

15.0 **IMPLEMENT** alternate pump procedure as follows:

15.1 **DECONTAMINATE** and **RINSE** liquid sample line using WATER SUPPLY PUMP as follows:

15.1.1 **CLOSE** valves 17 and 57. **CLOSE** valve 8 to close water transfer line.

15.1.2 **OPEN** valves 12 and 9 to route reagent to WATER SUPPLY PUMP.

15.1.3 **OPEN** valves 56 and 15.

15.1.4 **OPEN** valve 24 and **WAIT** 15 seconds.

15.1.5 **CLOSE** valves 26 and 24. **CLOSE** valves 15 and 56.

15.1.6 **CLOSE** valves 12 and 9 to close reagent lines to WATER SUPPLY PUMP.

15.1.7 **OPEN** valve 8 to route water to WATER SUPPLY PUMP.

15.1.8 **OPEN** valves 56 and 15.

15.1.9 **OPEN** valves 24 and 26. **WAIT** 15 seconds.

15.1.10 **CLOSE** valve 26. **CLOSE** valves 15 and 56.

15.1.11 **RETURN** to Step 6.6.

15.2 **RINSE** liquid sample line using REAGENT SUPPLY PUMP as follows:

15.2.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.

15.2.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.

15.2.3 **OPEN** valves 57 and 17.

15.2.4 **OPEN** valve 26 and **WAIT** 15 seconds.

15.2.5 **CLOSE** valve 26. **CLOSE** valves 17 and 57.

15.2.6 **CLOSE** valves 12 and 9 to close water lines to REAGENT SUPPLY PUMP.

15.2.7 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.

15.2.8 **RETURN** to Step 6.6.

#### SPECIAL REQUIREMENTS:

1. Label sample containers IAW Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE is to be worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.

#### EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Helium tank	as required
Flex hoses	as required
Decontaminant pail	1 each
Rinse pail	1 each
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Labeled sample bottles	as required
Sample packaging	as required
Reagent	as required
Liquid waste drums	as required
Open-head drums	as required
Household bleach (5 percent)	as required
Rags	as required
Waste bags	as required
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 14 REMOVE LIQUID WASTE FROM EDS CONTAINMENT VESSEL

The purpose of this procedure is to remove the treated liquid waste remaining in the containment vessel.

### PRECONDITIONS:

1. This procedure is contingent upon treatment being deemed complete (either as a result of meeting the treatment goal or exceeding the maximum treatment time).
  2. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
  3. Receipt of samples has been coordinated with laboratory and courier.
  4. Air monitoring must be operational.
  5. Waste drums are in place, filters are installed with filter cap removed, and drain hoses are in place.
  6. Setup and daily startup checklists have been completed.
  7. Decontaminant pail, water pail, and rags are positioned onto EDS Trailer.
- 1.0 **PREPARE** to transfer liquid waste from CONTAINMENT VESSEL as follows:
- 1.1 **VERIFY** CONTAINMENT VESSEL heaters are OFF. **PUSH** red VESSEL HEATER CONTROL OFF button on VESSEL HEATER CONTROL PANEL to turn CONTAINMENT VESSEL heaters off.
  - 1.2 **VERIFY** supply tank heaters are OFF. **PRESS** each red TANK HEATER CONTROLS OFF button to turn supply tank heaters off.

- 1.3 **VERIFY** CONTAINMENT VESSEL is in drain position. Then **PROCEED** to Step 1.4 or **POSITION** the CONTAINMENT VESSEL in the drain position as follows:

- 1.3.1 **OPERATE** ROTARY AGITATION SUBSYSTEM as follows:

**Note**

Containment vessel will only stop during normal operations in the HOME or DRAIN position after rotating in a clockwise direction.

**WARNING**

EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

**Caution**

Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.

- 1.3.1.1 **VERIFY** three PROCESS SHUTDOWN buttons are out and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.
- 1.3.1.2 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Docking Stations (Supply Hose, Vacuum Hose, Vessel Effluent Hose, Leak Detector Hose, and Hydraulic Pump Hose).
- 1.3.1.3 **VERIFY** LEFT and RIGHT CLAMP INTERLOCKS READY lights are illuminated (clamps are closed), and the CONTAINMENT VESSEL door is closed.



**Notes**

**Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.**

**Containment vessel will not commence rotating unless all seven interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate if placed in BYPASS mode. Containment vessel will continue to rotate even if one of the Docking Station positions comes open after rotation commences.**

- 1.3.1.4 **INSERT** and **TURN** Rotation Control Key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green HOME button, and red HALT light illuminates).
- 1.3.1.5 **VERIFY INTERLOCKS KEY** switch is set to ON (green READY light illuminates).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 1.3.1.6 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).
- 1.3.1.7 **PUSH** green DRAIN button to stop CONTAINMENT VESSEL in DRAIN position (green DRAIN button and red HALT button illuminates, and green ROTATE button goes off).
- 1.3.1.8 **TURN OFF** and **REMOVE** Rotation Control Key.

**CALLOUT: Announce time containment vessel rotation stopped.**

- 1.4 **RECORD** supply tank volumes and drum weights as shown on waste drum scales.

**CALLOUT: Announce supply tank volumes and initial drum weight (lbs).**

2.0 **START** effluent transfer as follows:

- 2.1 **CONNECT** Vessel Effluent Hose QE to Q22. **VERIFY** valve 23 is open and valve 29 is in "D1" position.
- 2.2 **OPEN** valve 37. **NOTE** CONTAINMENT VESSEL pressure on CONTAINMENT VESSEL pressure indicator on REAGENT SUPPLY CONTROL PANEL.
- 2.3 Slowly **OPEN** valve 22 until CONTAINMENT VESSEL is heard to begin venting and then **OPEN** valve 22 completely.
- 2.4 **VERIFY** CONTAINMENT VESSEL is draining by simultaneously observing readout on WASTE DRUM SCALE and CONTAINMENT VESSEL pressure indicator.
- 2.5 **PROCEED** to Step 3.0 when collecting a sample from the liquid waste stream or **PROCEED** to Step 5.0 to continue liquid waste transfer.

3.0 **PREPARE** to collect sample from liquid waste stream from valve 28 as follows:

- 3.1 **INSPECT** liquid sample bottle. **REPLACE**, if necessary.
- 3.2 **RECORD** liquid sample bottle label number.

4.0 **COLLECT** liquid waste stream sample from valve 28 as follows:

- 4.1 If necessary, **DON** leather gloves over rubber gloves.
- 4.2 **CHECK** CONTAINMENT VESSEL pressure on VESSEL PRESSURE indicator. **CLOSE** valve 29. Partially **CLOSE** valve 37.
- 4.3 **VERIFY** valve 28 is closed. **REMOVE** plug from valve 28 sample line with suitable wrench.
- 4.4 **PLACE** sample container under valve 28 and slowly **OPEN** valve 28.
- 4.5 **DRAIN** required liquid waste stream sample into liquid sample container and **CLOSE** valve 28. **CLOSE** liquid sample container.
- 4.6 **PLACE** liquid sample container into pail of decontaminant.
- 4.7 **REPLACE** plug onto valve 28 with suitable wrench.
- 4.8 **OPEN** valves 29 (to "D1" position) and 37 to resume draining CONTAINMENT VESSEL.

- 4.9 **REMOVE** liquid sample container from decontaminant pail and **PLACE** into pail of rinsewater.
- 4.10 **REMOVE** liquid sample container from rinse pail.
- 4.11 **PACK** liquid sample container into a separate secondary container or sample bag.

**Note**

**Monitor item IAW local monitoring program.**

- 4.12 **MONITOR** exterior of sample container to assure it is below criterion for permissible exposure levels. **RECORD** monitoring results.
- 4.13 **PLACE** packaged sample into overpack containing absorbent material, **SEAL** overpack, and **CARRY** overpack to PDS.
- 4.14 **COMPLETE** required chain-of-custody documents (see Annex A, Figures A-3 and A-4). **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.
- 4.15 **SELECT** one of the following and **PROCEED** as directed:
  - 4.15.1 **RETURN** to Procedure 13, Step 10.0 to continue/conclude agent treatment.
  - 4.15.2 **PROCEED** to Procedure 15, Step 7.0 to conclude rinsate transfer.
  - 4.15.3 **PROCEED** to Step 5.0 to continue liquid waste transfer.
- 5.0 **CONTINUE** liquid waste transfer operations as follows:
  - 5.1 **MONITOR** transfer lines for blockage during effluent transfer and **PROCEED** as follows:
    - 5.1.1 **DETECT** no blockage. **PROCEED** to Step 5.2 and **CONTINUE** effluent transfer operations.
    - 5.1.2 **DETECT** possible blockage when drum weight and/or CONTAINMENT VESSEL pressure shows no change. **PERFORM** one of the following:
      - 5.1.2.1 **PERFORM** Alternate Transfer Procedure. **PROCEED** to Step 12.0.

5.1.2.2 **BACK FLUSH** Vessel Effluent Hose as follows:

5.1.2.2.1 **RECORD** tank 1 volume on Effluent Worksheet.

5.1.2.2.2 **CLOSE** valve 29.

5.1.2.2.3 **START WATER SUPPLY PUMP** by opening valve 56. **PROCEED** as follows:

5.1.2.2.3.1 **PROCEED** to Step 5.1.2.2.4 when supply pump is operating correctly.

5.1.2.2.3.2 **PROCEED** to Step 11.0 when the supply pump is not operating correctly.

5.1.2.2.4 **OPEN** valve 15.

5.1.2.2.5 **OPEN** valve 18 (forces water through valves 37, 22, and 23).

5.1.2.2.6 **CLOSE** valves 37 and 15. **STOP WATER SUPPLY PUMP** by closing valve 56.

5.1.2.2.7 Slowly **OPEN** valve 29 to "D1" position to vent.

5.1.2.2.8 **CLOSE** valve 18.

5.1.2.2.9 Slowly **OPEN** valve 37 to drain.

5.1.2.2.10 **RECORD** tank 1 volume on Effluent Worksheet.

5.1.2.2.11 **RETURN** to Step 5.0.

5.2 **MONITOR** waste drum during transfer operations and **PERFORM** one of the following:

5.2.1 **PROCEED** to Step 5.3 when drum changeout is not required.

5.2.2 **CHANGE OUT** waste drum when half full or directed as follows:

5.2.2.1 **CLOSE** valve 29. **RECORD** waste drum identification number and weight. If required, **DON** leather gloves over rubber gloves.

**Note**

**Allow waste drums to cool to ambient temperature before removing rupture disc assembly and installing bung covers.**

**WARNING**

**AFTER VENTING CONTAINMENT VESSEL PRESSURE INTO THE WASTE DRUM, A HELIUM PURGE OF THE WASTE DRUM MUST BE PERFORMED TO FORCE ANY FUMES INTO THE FILTERED WASTE DRUM TO AVOID A POSSIBLE RELEASE OF HAZARDOUS FUMES DURING A DRUM CHANGEOUT.**

- 5.2.2.2 **DISCONNECT** Vessel Waste Drum Hose QF and Waste Drum Vent Hose QF from drum 1.
- 5.2.2.3 **INSTALL** new drum with Rupture Disc Assembly. **CONNECT** Vessel Waste Drum Hose QF and Waste Drum Vent Hose QF to new drum 1.
- 5.2.2.4 **VERIFY** waste drum scale is at 0 pounds.
- 5.2.2.5 **RECORD** time old drum was disconnected, time new drum connected, and number of new drum.
- 5.2.2.6 **RESUME** liquid waste transfer from CONTAINMENT VESSEL by opening valve 29 to "D1" position.
- 5.2.2.7 **RETURN** to Step 5.0 to continue with liquid waste transfer.

5.3 **STOP** liquid waste transfer operations as follows:

- 5.3.1 **LISTEN** for gas venting from CONTAINMENT VESSEL through drain line and then **CLOSE** valve 22 when gas begins venting.
- 5.3.2 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED, except valve 23. **RECORD** final drum weight.
- 5.3.3 **CLOSE** valve 37.

**Note**

**Effluent output is slightly more than the chemical reagent input from Table 3-1 and calculations on Effluent Worksheet because of contents of munition.**

- 5.4 **DETERMINE** and **RECORD** effluent weight by using Effluent Worksheet (see Annex A, Figure A-2).
- 5.5 **PERFORM** one of the following:
  - 5.5.1 **PROCEED** to Procedure 16 to collect a vapor sample.
  - 5.5.2 **DISCONNECT** Vessel Effluent Hose QE from Q22 and **CONNECT** it to Docking Station. **PROCEED** to Step 6.0.
- 6.0 **POSITION** CONTAINMENT VESSEL in HOME position by operating ROTARY AGITATION SUBSYSTEM as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 6.1 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch and **TURN** Rotation Control Key to AUTO position.
- 6.2 **VERIFY** green AUTO READY light illuminates and red HALT button illuminates.
- 6.3 **VERIFY** INTERLOCKS KEY switch is set to ON (green READY light is illuminated).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 6.4 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATION button illuminates and red HALT button goes off).
- 6.5 **PUSH** green HOME button to rotate CONTAINMENT VESSEL to HOME position (green HOME button illuminates and green ROTATION button goes off).
- 6.6 **TURN OFF** and **REMOVE** Rotation Control Key.
- 7.0 **PERFORM** one of the following:
  - 7.1 **PROCEED** to Procedure 15 to rinse CONTAINMENT VESSEL.
  - 7.2 When collecting a liquid waste stream sample from liquid waste drum, **PROCEED** to Step 8.0.
  - 7.3 When collecting a vapor sample, **PROCEED** to Procedure 16.
- 8.0 **COLLECT** liquid waste stream sample from liquid waste drum as follows:
  - 8.1 **INSPECT** liquid sample container. **REPLACE**, if necessary, and **RECORD** liquid sample bottle label number.
  - 8.2 **OPEN** liquid sample container and **PLACE** it on catch tray beside waste drum.
  - 8.3 **REMOVE** liquid waste drum bung plug and **PLACE** it on catch tray.
  - 8.4 **INSERT** drum thief or composite liquid waste sampler (coliwasa) tube into liquid waste drum and **LOWER** it all the way to the waste drum bottom.
  - 8.5 **SEAL** drum thief or coliwasa tube, **REMOVE** it from liquid waste drum, and **CHECK** for stratification in the drum thief or coliwasa tube liquid contents.
  - 8.6 **PLACE** drum thief or coliwasa tube into liquid sample container, **UNSEAL** drum thief or coliwasa tube, and **DRAIN** drum thief or coliwasa tube contents into liquid waste container as follows:
    - 8.6.1 **DRAIN** contents into one liquid sample container when stratification is not present.

- 8.6.2 **DRAIN** each phase of the stratification into a separate liquid sample container when more than one phase is seen in drum thief or coliwasa tube.
- 8.7 **REPEAT** Steps 8.4 through 8.6.2 until liquid sample container(s) are within levels designated by the supporting laboratory.
- 8.8 **CLOSE** liquid sample container(s) and liquid waste drum.
- 8.9 **PROCESS** drum thief or coliwasa tube as follows:
  - 8.9.1 **DECONTAMINATE** coliwasa tube IAW local procedures.
  - 8.9.2 **DISPOSE** of drum thief as follows:
    - 8.9.2.1 **PLACE** drum thief into sampled liquid waste drum.
    - 8.9.2.2 **BREAK** drum thief against waste drum's inner side and **ASSURE** all drum thief fragments are within liquid waste drum.
- 9.0 **PROCESS** sample container(s) as follows:
  - 9.1 **PLACE** liquid sample container into pail of decontaminant.
  - 9.2 **REMOVE** liquid sample container from decontaminant pail and **PLACE** into pail of rinsewater.
  - 9.3 **REMOVE** liquid sample container from rinse pail.
  - 9.4 **PACK** liquid sample container into a separate secondary container or sample bag.

**Note**

**Monitor item IAW local monitoring program.**

- 9.5 **MONITOR** exterior of liquid sample container to assure it is below criteria for permissible exposure levels. **RECORD** monitoring results.
- 9.6 **PLACE** packaged sample container into overpack containing absorbent material. **SEAL** and **CARRY** overpack to PDS.
- 9.7 **COMPLETE** required chain-of-custody documents (see Annex A, Figures A-3 and A-4). **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.



10.0 **PROCEED** to Procedure 15.

**ALTERNATE PROCEDURE:**

11.0 **IMPLEMENT** alternate pump procedures for faulty WATER SUPPLY PUMP as follows:

11.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.

11.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.

11.3 **START** water transfer by opening valve 57 and 17.

11.4 **STOP** water transfer by closing valves 17 and 57. **OPEN** valve 29 to "D1" position.

11.5 **CLOSE** valves 9 and 12 to close water lines to REAGENT SUPPLY PUMP.

11.6 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.

11.7 **RETURN** to Step 5.1.2.2.9.

12.0 **IMPLEMENT** alternate effluent transfer operations as follows:

12.1 **CLOSE** valve 22.

12.2 **CLOSE** valve 37. **DISCONNECT** Vessel Effluent Hose QE from Q22 and **CONNECT** it to Docking Station.

- 12.3 **POSITION** CONTAINMENT VESSEL in HOME position by operating ROTARY AGITATION SUBSYSTEM as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 12.3.1 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch and **TURN** Rotation Control Key to AUTO position.
- 12.3.2 **VERIFY** green AUTO READY light illuminates and red HALT button illuminates.
- 12.3.3 **VERIFY** INTERLOCKS KEY switch is set to ON (green READY light is illuminated).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 12.3.4 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATION button illuminates and red HALT button goes off).
- 12.3.5 **PUSH** green HOME button to rotate CONTAINMENT VESSEL to HOME position (green HOME button illuminates and green ROTATION button goes off).
- 12.3.6 **TURN OFF** and **REMOVE** Rotation Control Key.

- 12.4 **CONNECT** adapter to Q24. **DISCONNECT** CONTAINMENT VESSEL Effluent Hose QE from Docking Station and **CONNECT** it to adapter at Q24.
- 12.5 **OPEN** valves 37 and 26.
- 12.6 Slowly **OPEN** valve 24 to commence effluent transfer operations.
- 12.7 **MONITOR** transfer lines for blockage during effluent transfer and **PROCEED** as follows:
  - 12.7.1 **DETECT** no blockage. **PROCEED** to Step 12.8, and **CONTINUE** effluent transfer operations.
  - 12.7.2 **DETECT** possible blockage by drum weight and/or CONTAINMENT VESSEL pressure showing no change. **BACK FLUSH** CONTAINMENT VESSEL Effluent Hose as follows:
    - 12.7.2.1 **RECORD** tank 1 volume on Effluent Worksheet.
    - 12.7.2.2 **CLOSE** valve 29.
    - 12.7.2.3 **START** WATER SUPPLY PUMP by opening valve 56.
    - 12.7.2.4 **OPEN** valve 15.
    - 12.7.2.5 **OPEN** valve 18 (forces water through valves 37, 24, and 26)
    - 12.7.2.6 **CLOSE** valves 37 and 15. **STOP** WATER SUPPLY PUMP by closing valve 56.
    - 12.7.2.7 Slowly **OPEN** valve 29 to "D1" position to vent.
    - 12.7.2.8 **CLOSE** valve 18.
    - 12.7.2.9 Slowly **OPEN** valve 37 to commence CONTAINMENT VESSEL drain.
    - 12.7.2.10 **RECORD** tank 1 volume on Effluent Worksheet, and **PROCEED** to Step 12.8.
- 12.8 **MONITOR** waste drum during transfer operations and **PERFORM** one of the following:
  - 12.8.1 **PROCEED** to Step 12.9 when drum changeout is not required.

12.8.2 **CHANGE OUT** waste drum when half full or directed as follows:

12.8.2.1 **RETURN** to Step 5.2.2. **PERFORM** Steps 5.2.2.1 through 5.2.2.6 and then **PROCEED** to Step 12.8.2.2.

12.8.2.2 **RETURN** to Step 12.6.

12.9 **STOP** liquid waste transfer operations as follows:

12.9.1 **LISTEN** for gas venting from CONTAINMENT VESSEL through drain line and then **CLOSE** valve 24 when gas begins venting.

12.9.2 **VERIFY** all valves on CONTAINMENT VESSEL door are **CLOSED**, except valve 23. **RECORD** final drum weights.

**CALLOUT:** Announce final drum weights (lbs).

**Note**

**Effluent output is slightly more than the chemical reagent input from Table 3-1 and calculations on Effluent Worksheet because of contents of munition.**

12.9.3 **DETERMINE** and **RECORD** effluent weight by using Effluent Worksheet (see Annex A, Figure A-2).

12.9.4 **CLOSE** valve 37. **DISCONNECT** Vessel Effluent Hose QE from adapter on Q24 and **CONNECT** it to Docking Station.

12.9.5 **DISCONNECT** adapter from Q24 and **STORE** in appropriate location.

12.10 **RETURN** to Step 7.0.

**SPECIAL REQUIREMENTS:**

PPE worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Flex hoses	as required
Spill containment pan	1 each
Liquid waste drums	as required
Rags	as required
Drum thief or coliwasa tube	1 each
Rotation control key	1 each
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 15 RINSE CONTAINMENT VESSEL

The purpose of this procedure is to rinse the containment vessel after the treated liquid waste has been removed.

### PRECONDITIONS:

1. Monitoring of waste drum level has been conducted to avoid overfilling drum.
2. Air monitoring must be operational.
3. Setup and daily startup checklists have been completed.
4. Receipt of samples has been coordinated with laboratory and courier.
5. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
6. Decontaminant pail, water pail, and rags are positioned onto EDS Trailer.

### 1.0 **PREPARE** to rinse CONTAINMENT VESSEL as follows:

- 1.1 **VERIFY** supply tank(s) contain appropriate water/rinsate at required amounts and temperature IAW Table 3-1.
- 1.2 **CONNECT** supply hose QS to Q19. **VERIFY** valves 23 and 52 are open.
- 1.3 **RECORD** supply tank level(s) on Effluent Worksheet (Annex A, Figure A-2) and temperature(s).

**CALLOUT:** Announce volume and temperature of supply tanks.

- 1.4 **START WATER SUPPLY PUMP** by opening valves 56 and 15 or **REAGENT SUPPLY PUMP** by opening valves 57 and 17. **PROCEED** as follows:
  - 1.4.1 **PROCEED** to Step 1.5 when supply pump is operating correctly.
  - 1.4.2 **PROCEED to Step 10.0 when supply pump is not operating correctly.**
- 1.5 **OPEN** valves 19 and 21. **COMMENCE** CONTAINMENT VESSEL rinse.

- 2.0 **TERMINATE** rinse transfer to CONTAINMENT VESSEL as follows:
  - 2.1 **CLOSE** valves 19 and 21.
  - 2.2 **TURN OFF** appropriate supply pump as follows:
    - 2.2.1 For WATER SUPPLY PUMP, **CLOSE** valves 15 and 56.
    - 2.2.2 For REAGENT SUPPLY PUMP, **CLOSE** valves 17 and 57.
  - 2.3 **ASSURE** valve 29 is open to "D1A" position to drain to drum 1A. Slowly **OPEN** valve 18 to vent pressure and then **CLOSE** valve 18.
  - 2.4 **DISCONNECT** supply hose QS from Q19 and **CONNECT** to Hose Docking Station.
- 3.0 **START** CONTAINMENT VESSEL rinse time IAW Table 3-1 as follows:
  - 3.1 **OPERATE** ROTARY AGITATION SUBSYSTEM as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 3.1.1 **VERIFY** jack support is down.
- 3.1.2 **VERIFY** three PROCESS SHUTDOWN buttons are out and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.



- 3.1.3 **VERIFY** INTERLOCKS KEY switch is set to ON (green READY light illuminates).
- 3.1.4 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
  - 3.1.4.1 **PROCEED** to Step 3.1.5 when green INTERLOCKS READY light is illuminated.
  - 3.1.4.2 **PROCEED** to Step 3.1.4.2.1 when green INTERLOCKS READY light is not illuminated.
    - 3.1.4.2.1 **CHECK** and **SECURE** all hoses in the Hose Docking Stations. **CHECK CLAMP** INTERLOCKS READY lights are illuminated.
    - 3.1.4.2.2 **PROCEED** to Step 3.1.5 when green INTERLOCKS READY light illuminates or to Step 3.1.4.2.3 when light does not illuminate.
    - 3.1.4.2.3 **TURN** Interlocks Control Key to BYPASS position (red BYPASS light illuminates). **PROCEED** to Step 3.1.5.
- 3.1.5 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch. **TURN** Rotation Control Key to AUTO position.
- 3.1.6 **VERIFY** green AUTO READY light illuminates, and red HALT button illuminates.

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 3.1.7 **PUSH** green ROTATE button (green ROTATE button illuminates and red HALT button goes off) and **ROTATE** CONTAINMENT VESSEL for period of time IAW Table 3-1.

- 3.2 **RECORD** time CONTAINMENT VESSEL rotation started.

**CALLOUT: Announce time containment vessel rotation turned ON.**

- 3.3 **TURN ON** CONTAINMENT VESSEL heaters, if applicable, IAW Table 3-1 for chemical agent fill encountered as follows:

**WARNING**

**DIRECT CONTACT WITH CONTAINMENT VESSEL HEATERS CAN RESULT IN INJURY.**

- 3.3.1 **PUSH** green VESSEL HEATER CONTROL ON button on VESSEL HEATER CONTROL PANEL.
- 3.3.2 **CHECK** setpoint temperature on VESSEL HEATER CONTROL PANEL. **ADJUST** setpoint temperature as needed with setpoint temperature modification arrows.

**Note**

**When monitoring internal containment vessel temperature and temperature fails to remain within  $\pm 5$  degrees of setpoint, perform immediate action procedure in Annex F to monitor external containment vessel skin temperature.**

- 3.3.3 **MONITOR** temperature to assure CONTAINMENT VESSEL temperature reaches correct temperature for chemical fill IAW Table 3-1 and remains within  $\pm 5$  degrees of setpoint.

**CALLOUT: Announce time containment vessel heaters turned ON.**

- 3.4 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.
- 4.0 **PERFORM** one of the following:
- 4.1 **COLLECT** a liquid sample via valve 25 (liquid sample valve assembly) when directed by returning to Procedure 13, Step 2.0.
- 4.2 **STOP** ROTARY AGITATION SUBSYSTEM in DRAIN position as follows:
- 4.2.1 **TURN OFF** CONTAINMENT VESSEL heaters if previously turned ON.

- 4.2.2 **PUSH** green DRAIN button (green DRAIN button illuminates and red HALT button goes off) to position CONTAINMENT VESSEL in DRAIN position (green ROTATE button goes off and green DRAIN and red HALT buttons illuminate).
- 4.2.3 **TURN OFF** and **REMOVE** Rotation Control Key.
- 4.2.4 **RECORD** time CONTAINMENT VESSEL rotation stopped, CONTAINMENT VESSEL pressure, CONTAINMENT VESSEL temperature, drum weight, supply tank volume, and drum sample number.

**CALLOUT:** Announce time containment vessel rotation turned OFF, containment vessel pressure, containment vessel temperature, initial drum weight, supply tank volume, and drum number.

5.0 **DRAIN** CONTAINMENT VESSEL as follows:

- 5.1 **CONNECT** Vessel Effluent Hose QE to Q22.
- 5.2 **OPEN** valve 37.
- 5.3 **VERIFY** valve 29 is in "D1A" position to drain to drum 1A.
- 5.4 Slowly **OPEN** valve 22 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 22 completely.

**Note**

**If vessel effluent hose becomes clogged with debris, back flush using Procedure 14, Steps 5.1.2.2 through 5.1.2.2.10.**

6.0 **COLLECT** a liquid sample of the rinsate when directed using one of the following or **PROCEED** to Step 7.0.

- 6.1 **RETURN** to Procedure 14, Step 4.0 to collect a sample from the effluent liquid rinse stream (valve 28).
- 6.2 **RETURN** to Procedure 14, Step 8.0 to collect a sample from a waste drum.

7.0 **PREPARE** to cease rinsate transfer as follows:

- 7.1 **CLOSE** valve 22 when CONTAINMENT VESSEL has reached atmospheric pressure.

- 7.2 **CLOSE** valve 37. **DISCONNECT** Vessel Effluent Hose QE from Q22 and **CONNECT** it to Docking Station connector.
- 7.3 **RECORD** weight of liquid waste drum and time CONTAINMENT VESSEL rinse ended.

**CALLOUT:** Announce final drum weight (lbs).

8.0 **PERFORM** one of the following:

- 8.1 For additional rinses, **POSITION** the CONTAINMENT VESSEL in the HOME position as follows:

**Note**

Containment vessel will only stop during normal operations in the HOME or DRAIN position after rotating in a clockwise direction.

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 8.1.1 **VERIFY** three PROCESS SHUTDOWN buttons are out and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.
- 8.1.2 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Docking Stations (Supply Hose, Vacuum Hose, Vessel Effluent Hose, Leak Detector Hose, and Hydraulic Pump Hose).

- 8.1.3 **VERIFY** LEFT and RIGHT CLAMP INTERLOCKS READY lights are illuminated (clamps are closed), and CONTAINMENT VESSEL door is closed.

**Notes**

**Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.**

**Containment vessel will not commence rotating unless all seven interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate if placed in BYPASS mode. Containment vessel will continue to rotate even if one of the Docking Station positions comes open after rotation commences.**

- 8.1.4 **INSERT** and **TURN** Rotation Control Key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green DRAIN button, and red HALT light illuminate).
- 8.1.5 **VERIFY** INTERLOCKS KEY switch is set to ON (green READY light illuminates).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 8.1.6 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).
- 8.1.7 **PUSH** green HOME button to stop CONTAINMENT VESSEL in HOME position (green HOME button illuminates and green ROTATE button goes off).
- 8.1.8 **TURN OFF** and **REMOVE** Rotation Control Key.
- 8.1.9 **REPEAT** Steps 1.0 through 7.3 for additional rinses, as needed.
- 8.2 **PROCEED** to Step 9.0.

9.0 **PERFORM** one of the following procedures as directed:

9.1 **PROCEED** to Procedure 16 to collect a vapor sample.

9.2 **PROCEED** to Procedure 17 when no vapor sample is required.

**ALTERNATE PROCEDURE:**

10.0 **IMPLEMENT** one of the following alternate pump procedures:

10.1 **IMPLEMENT** alternate pump procedure for faulty REAGENT SUPPLY PUMP as follows:

10.1.1 **CLOSE** valves 17 and 57. **CLOSE** valve 8 to close water transfer line.

10.1.2 **OPEN** valves 12 and 9 to route reagent to WATER SUPPLY PUMP.

10.1.3 **OPEN** valves 56 and 15. **START** reagent transfer by opening valves 19 and 21.

10.1.4 **STOP** reagent transfer by closing valves 15 and 56.

10.1.5 **CLOSE** valves 12 and 9 to close reagent lines to WATER SUPPLY PUMP.

10.1.6 **OPEN** valve 8 to route water to WATER SUPPLY PUMP.

10.1.7 **RETURN** to Step 2.3.

10.2 **IMPLEMENT** alternate pump procedures for faulty WATER SUPPLY PUMP as follows:

10.2.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.

10.2.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.

10.2.3 **START** water transfer by opening valves 57 and 17.

10.2.4 **CLOSE** valves 21 and 19. **CLOSE** valves 17 and 57.

10.2.5 **CLOSE** valves 9 and 12 to close water lines to REAGENT SUPPLY PUMP.

10.2.6 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.

10.2.7 **RETURN** to Step 2.3.

SPECIAL REQUIREMENTS:

1. Air monitoring must be in place unless all sample containers are decontaminated.
2. PPE is IAW the HASP, if applicable, and/or at the discretion of the SSHO.
3. Label sample containers IAW Sampling and Analysis Plan.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Flex hoses	as required
Spill containment pan	1 each
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Sample containers	as required
Sample packaging	as required
Liquid waste drums	as required
Household bleach (5 percent)	as required
Rags	as required
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 16 COLLECT VAPOR SAMPLE

This procedure is performed only at the direction of the Site Manager/EDS Crew Supervisor.

The purpose of this operation is to collect a vapor sample.

### PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
2. Receipt of samples has been coordinated with laboratory and courier.
3. Waste drums are in place, filters are installed, and drain hoses are in place.
4. Air monitoring must be operational.
5. Setup and daily startup checklists have been completed.
6. Decontaminant pail, water pail, and rags are positioned onto EDS Trailer.

### 1.0 **PREPARE** to flush CONTAINMENT VESSEL with helium as follows:

- 1.1 **RECORD** helium cylinder pressure (psig) shown on helium cylinder regulator gauge.

**CALLOUT:** Announce helium bottle pressure reading.

### 1.2 **FLUSH** CONTAINMENT VESSEL with helium as follows:

- 1.2.1 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED, except valve 23.
- 1.2.2 **VERIFY** Vessel Effluent Hose QE is connected to Q22 and valve 29 is open to "D1" position.
- 1.2.3 **CONNECT** supply hose QS to Q19. **RECORD** CONTAINMENT VESSEL pressure.

- 1.2.4 **ASSURE** REAGENT SUPPLY PANEL Helium Regulator psig exceeds CONTAINMENT VESSEL psig. **PROCEED** as follows:
  - 1.2.4.1 When REAGENT SUPPLY PANEL Helium Regulator psig exceeds CONTAINMENT VESSEL psig, **OPEN** valve 38. **PROCEED** to Step 1.2.5.
  - 1.2.4.2 When REAGENT SUPPLY PANEL Helium Regulator psig does not exceed CONTAINMENT VESSEL psig, **OPEN** valve 16. **PROCEED** to Step 1.2.5.
- 1.2.5 **OPEN** valves 19 and 21.
- 1.2.6 **OPEN** valve 37, then slowly **OPEN** valve 22 until CONTAINMENT VESSEL is heard to begin venting.
- 1.2.7 **PURGE** CONTAINMENT VESSEL until a differential of 500 psig is achieved from earlier recorded helium cylinder pressure.
- 1.2.8 **CLOSE** valves 21 and 19.
- 1.2.9 **CLOSE** valve 38 or valve 16.
- 1.2.10 **VENT** CONTAINMENT VESSEL until CONTAINMENT VESSEL pressure is between 2 psig and 5 psig and then **CLOSE** in sequence valves 22 and 37.
- 1.2.11 Slowly **OPEN** valve 18 to relieve pressure.
- 1.2.12 **CLOSE** valve 18.
- 1.2.13 **RECORD** helium cylinder pressure (psig) shown on helium cylinder regulator gauge.

**CALLOUT:** Announce helium bottle pressure reading.

- 2.0 **COLLECT** vapor samples by performing one of the following:
  - 2.1 **PROCEED** to Step 3.0 to collect vapor sample via sample valve assembly.
  - 2.2 **PROCEED** to Step 10.0 to collect vapor sample via Tedlar<sup>®</sup> bag.
- 3.0 **PREPARE** vapor sample valve assembly as follows:
  - 3.1 **INSPECT** sample valve assembly for damage. **DISCARD, REPLACE,** and **NOTE** on sample log when damaged.

- 3.2 **ASSURE** sample valve assembly has the correct sample label on it. **RECORD** sample number.
- 3.3 **VERIFY** all valves on CONTAINMENT VESSEL are CLOSED except valve 23.
- 4.0 **COLLECT** vapor sample as follows:
  - 4.1 **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station. **CONNECT** vacuum hose QV to Q19. **OPEN** valve 41.
  - 4.2 **OPEN** valves 19 and 20. **PUSH** green VACUUM PUMP ON button to run vacuum pump until at least -20 inches of mercury (Hg) is displayed on vacuum gauge to evacuate sample line.
  - 4.3 **PRESS** red VACUUM PUMP OFF button. **CLOSE** valves 19 and 41.
  - 4.4 **DISCONNECT** vacuum hose QV from Q19 and **CONNECT** it to Docking Station.
  - 4.5 **CONNECT** supply hose QS to Q19 and **OPEN** valve 21.
  - 4.6 **OPEN** vapor sample valve 20 (10-mL vapor sample bottle) and tightly **CLOSE** valve 20.
- 5.0 **RINSE** vapor sample lines with water as follows:
  - 5.1 **OPEN** valve 56 and 15. **PROCEED** as follows:
    - 5.1.1 **PROCEED** to Step 5.2 when supply pump is operating correctly.
    - 5.1.2 **PROCEED** to Step 12.0 when the supply pump is not operating correctly.
  - 5.2 **OPEN** valve 19 and **WAIT** 15 seconds.
  - 5.3 **CLOSE** valves 21, 19, 15, and 56.
  - 5.4 **OPEN** valve 18 to drain any liquid to drum. **CLOSE** valve 18.
  - 5.5 **OPEN** valve 38 to blow helium through the sample line.

- 5.6 **OPEN** valves 19 and 21 and **LISTEN** for gas venting.
- 5.7 **CLOSE** valves 38, 21, and 19 in sequential order.
- 5.8 **OPEN** valves 18 and 19 in order to release pressure.
- 5.9 **CLOSE** valves 19 and 18.
- 6.0 **REMOVE** vapor sample valve 20 as follows:
  - 6.1 **VERIFY** valve 21 is **CLOSED**, and **SECURE** vapor sample valve 20 with a 3/4-inch open-end wrench.
  - 6.2 **LOOSEN** fittings on both sides of valve 20 using a 5/8-inch open-end wrench. **VERIFY** valve 21 is tightly **CLOSED**.
  - 6.3 **LOOSEN** handle securing valve 19, and **SLIDE** valve 19 to the left. **REMOVE** valve 20. **RECORD** time valve 20 removed.

**CALLOUT:** Announce time valve 20 is removed from containment vessel door.

- 7.0 **PREPARE** vapor sample valve 20 for transport as follows:
  - 7.1 **PLACE** pipe plug and lab adapter into valve openings of valve 20.
  - 7.2 **SECURE** valve 20 in a vise, and **TIGHTEN** both fittings to 30 ft-lbs using the torque wrench.
  - 7.3 **PLACE** valve 20 assembly in pail of decontaminant.
  - 7.4 **REMOVE** sample valve 20 from decontaminant pail and **PLACE** into rinse pail of water.
  - 7.5 **REMOVE** valve 20 from rinse pail, and **PACK** into a separate secondary container or bag.

**Note**

**Monitor item IAW local monitoring program.**

- 7.6 **MONITOR** exterior of valve 20 to assure it is below criterion for permissible exposure levels. **RECORD** monitoring results.

- 7.7 **PLACE** packaged valve 20 into overpack containing absorbent material, **SEAL** overpack, and **CARRY** overpacked valve 20 to the PDS.
- 7.8 **COMPLETE** chain-of-custody documents (see Annex A, Figures A-3 and A-4). **ATTACH** chain-of-custody documents to packaging, and **TRANSFER** to courier.
- 8.0 **INSTALL** a new vapor sample valve 20 IAW Procedure 9, Step 11.0.
- 9.0 **VERIFY** all valves on REAGENT SUPPLY PANEL and CONTAINMENT VESSEL door are CLOSED except valve 23. **PROCEED** to Step 11.0.
- 10.0 **COLLECT** vapor sample in a Tedlar<sup>®</sup> bag as follows:
  - 10.1 **PREPARE** CONTAINMENT VESSEL as follows:
    - 10.1.1 **VERIFY** Tedlar<sup>®</sup> bag adapter is installed.
    - 10.1.2 **VERIFY** all valves on CONTAINMENT VESSEL are CLOSED except valve 23.
  - 10.2 **NOTE** CONTAINMENT VESSEL pressure. **PROCEED** to one of the following:
    - 10.2.1 **PROCEED** to Step 10.3 when CONTAINMENT VESSEL pressure is between 2 and 5 psig.
    - 10.2.2 **PROCEED** to Step 10.2.2.1 when CONTAINMENT VESSEL pressure is less than 2 psig.
      - 10.2.2.1 **VERIFY** supply hose QS is connected to Q19. **OPEN** valves 38 and 19.
      - 10.2.2.2 **OPEN** valve 21 and **ALLOW** helium to vent into CONTAINMENT VESSEL until 2 to 5 psig is achieved.
      - 10.2.2.3 **CLOSE** valves 21, 19, and 38 in sequential order.
      - 10.2.2.4 **OPEN** valve 18 to vent pressure and then **CLOSE** valve 18.
      - 10.2.2.5 **PROCEED** to Step 10.3.
    - 10.2.3 **PROCEED** to Step 10.2.3.1 when CONTAINMENT VESSEL pressure exceeds 5 psig.

10.2.3.1 **OPEN** valve 37. Slowly **OPEN** valve 22 and **ALLOW** CONTAINMENT VESSEL to vent until CONTAINMENT VESSEL pressure is between 2 and 5 psig.

10.2.3.2 **CLOSE** valves 22 and 37 when CONTAINMENT VESSEL pressure is between 2 and 5 psig.

10.2.3.3 **PROCEED** to Step 10.3.

10.3 **ATTACH** Tedlar® bag to Tedlar® bag adapter. **ASSURE** Tedlar® bag has correct sample label on it.

**CALLOUT:** Announce containment vessel pressure and temperature.

10.4 **COLLECT** vapor sample as follows:

10.4.1 **OPEN** valve 21 and Tedlar® bag valve in sequential order.

10.4.2 Slowly **OPEN** valve 20 until Tedlar® bag inflates with approximately a 10-liter vapor sample. Immediately **CLOSE** valve 20.

10.4.3 **CLOSE** valve 21 and Tedlar® bag valve in sequential order.

10.4.4 **REMOVE** Tedlar® bag and **TRANSFER** Tedlar® bag to monitoring personnel.

**CALLOUT:** Announce time Tedlar® bag is removed from containment vessel door.

10.4.5 **PERFORM** one of the following:

10.4.5.1 **PERFORM** Steps 10.3 through 10.4.4 for further vapor samples in Tedlar® bags and then **PROCEED** to Step 10.4.5.2.

10.4.5.2 Slowly **OPEN** valve 18 to vent supply hose of helium. **CLOSE** valve 18. **PROCEED** to Step 11.0.

11.0 **PERFORM** one of the following:

11.1 If vapor sample was taken after neutralent drain, **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station. **RETURN** to Procedure 14, Step 5.5.2.

11.2 **PROCEED** to Procedure 17.

**ALTERNATE PROCEDURE:**

- 12.0 **IMPLEMENT** alternate pump procedures for faulty WATER SUPPLY PUMP as follows:
- 12.1 **CLOSE** valves 15 and 56. **CLOSE** valve 11 to close reagent transfer line.
  - 12.2 **OPEN** valves 9 and 12 to route water to REAGENT SUPPLY PUMP.
  - 12.3 **START** water transfer by opening valves 57 and 17.
  - 12.4 **OPEN** valve 19 and **WAIT** 15 seconds.
  - 12.5 **CLOSE** valves 21, 19, 17, and 57.
  - 12.6 **CLOSE** valves 9 and 12 to close water lines to REAGENT SUPPLY PUMP.
  - 12.7 **OPEN** valve 11 to route reagent to REAGENT SUPPLY PUMP.
  - 12.8 **RETURN** to Step 5.4.

**SPECIAL REQUIREMENTS:**

- 1. Label sample containers IAW the Sampling and Analysis Plan.
- 2. Air monitoring must be in place unless all sample containers are decontaminated.
- 3. PPE must be worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Flex hoses	as required
Sample bag or secondary container	as required
Decontaminant pail	1 each
Rinse pail	1 each
Chain-of-custody documents	as required
Sample bottles	as required
Sample packaging	as required
Liquid waste drums	as required
Household bleach (5 percent)	as required
Rags	as required
Vessel rotation control key	1 each
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Helium gas cylinder	1 each
Helium pressure regulator	1 each
Tedlar <sup>®</sup> bag	as required
Tedlar <sup>®</sup> bag adapter	1 each



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## PROCEDURE 17 OPEN CONTAINMENT VESSEL DOOR

The purpose of this procedure is to open the containment vessel door after removal of liquid waste.

### PRECONDITIONS:

1. Setup and daily startup checklists have been completed.
2. Air monitoring must be operational.
3. PPE during drum transfer is to be worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.
4. EDS Crew Supervisor must consult with EDS System Manager/Site Supervisor to ensure appropriate parameters are met before the containment vessel door is opened.

### WARNINGS

**NEVER OPEN CONTAINMENT VESSEL DOOR WHEN CONTAINMENT VESSEL IS PRESSURIZED TO ANY LEVEL ABOVE ATMOSPHERIC PRESSURE. INTERNAL PRESSURE MAY FORCE CONTAINMENT VESSEL DOOR OPEN PREMATURELY AS CLAMPS ARE LOOSENEED, RESULTING IN POSSIBLE INJURY OR DAMAGE.**

**DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH CONTAINMENT VESSEL.**

**CALLOUT:** EDS Crew Supervisor will consult with EDS System Manager/Site Supervisor to assure appropriate parameters are met before the containment vessel door is opened.

- 1.0 **VENT** CONTAINMENT VESSEL as follows:
  - 1.1 **ASSURE** valve 29 is OPEN to appropriate drum.
  - 1.2 **VERIFY** supply hose QS is connected to Q19 and effluent hose QE is connected to Q22.

- 1.3 **OPEN** valves 18 and 21. Slowly **OPEN** valve 19 to begin venting of CONTAINMENT VESSEL.
  - 1.4 **VERIFY** CONTAINMENT VESSEL pressure is at atmospheric pressure. **CLOSE** valves 21, 19, and 18. **DISCONNECT** supply hose QS from Q19 and **CONNECT** it to Docking Station.
  - 1.5 **ALLOW** any remaining liquid to drain into waste drum. **DISCONNECT** Vessel Effluent Hose QE from Q22 and **CONNECT** it to Docking Station.
- 2.0 **POSITION** the CONTAINMENT VESSEL in the HOME position as follows:

**Note**

Containment vessel will only stop during normal operations in the HOME or DRAIN position after rotating in a clockwise direction.

**WARNING**

EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

**Caution**

Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.

- 2.1 **VERIFY** three PROCESS SHUTDOWN buttons are out and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.
- 2.2 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Docking Stations (Supply Hose, Vacuum Hose, Vessel Effluent Hose, Leak Detector Hose, and Hydraulic Pump Hose).

- 2.3 **VERIFY** LEFT and RIGHT CLAMP INTERLOCKS READY lights are illuminated (clamps are closed), and the CONTAINMENT VESSEL door is closed.

**Notes**

**Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.**

**Containment vessel will not commence rotating unless all seven interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate if placed in BYPASS mode. Containment vessel will continue to rotate even if one of the Docking Station positions comes open after rotation commences.**

- 2.4 **INSERT** and **TURN** Rotation Control Key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green DRAIN button, and red HALT light illuminate).
- 2.5 **VERIFY** INTERLOCKS KEY switch is set to ON (green READY light illuminates).

**Note**

**Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.**

- 2.6 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).
- 2.7 **PUSH** green HOME button to stop CONTAINMENT VESSEL in HOME position (green HOME button illuminates and green ROTATE button goes off).
- 2.8 **TURN OFF** and **REMOVE** Rotation Control Key.
- 3.0 **PREPARE** to open CONTAINMENT VESSEL door as follows:
- 3.1 **LIFT UP** DOOR OPEN INTERLOCK and **RAISE** CONTAINMENT VESSEL support jack to upright position.

**Caution**

**Do not turn jack wheel crank more than 15 revolutions after completing Step 3.2. Doing so may result in damage to drive gearbox.**

**Caution**

**Verify bottom edge of door open interlock is above top edge of the lower portion of vessel door hinge before attempting to open vessel door to avoid possibly damaging door open interlock.**

- 3.2 **TURN** jack wheel crank counterclockwise until DOOR OPEN INTERLOCK contacts bottom of door hinge. **TURN** jack wheel crank counterclockwise 4 to 6 more revolutions.
- 3.3 **POSITION** debris pan under CONTAINMENT VESSEL door, open-head solid waste drum, and cleaning materials.
- 3.4 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
- 3.5 **PUSH** green Hydraulic Nut Pump ON button (light illuminates).
- 3.6 **TURN** red Hydraulic Nut Pump PRESSURE switch to HIGH.

4.0 **RELEASE** hydraulic nuts as follows:

**WARNING**

**NEVER STAND OR PLACE ANY PARTS OF BODY IN LINE WITH  
THREADED RODS WHEN HYDRAULIC NUTS ARE UNDER PRESSURE.  
FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Note**

**To monitor hydraulic nuts, pump operator should be positioned in  
front of containment vessel.**

4.1 **ASSURE** all personnel are clear of hydraulic nuts and hydraulic hoses.

4.2 **PUSH** and **HOLD** Hydraulic Nut Pump ADVANCE button to tighten  
hydraulic nuts.

**Note**

**Pump is set to automatically turn off when pressure reaches 7,900 psig.**

4.3 **MONITOR** pump pressure gauge to assure 7,600 to 7,900 psig is  
achieved.

4.4 **DON** leather gloves over rubber gloves.

4.5 **TURN** locking rings counterclockwise simultaneously to loosen, top and  
bottom, until all four are flush with piston end and then back off 1/4 turn.

4.6 **PUSH** and **HOLD** Hydraulic Nut Pump RETRACT button to release  
hydraulic pressure. **ASSURE** hydraulic nuts are fully retracted.

5.0 **STOP** HYDRAULIC TENSIONER SUBSYSTEM as follows:

5.1 **PRESS** red Hydraulic Nut Pump OFF button on VESSEL CONTROL  
PANEL.

5.2 **VERIFY** pressure gauge reads approximately 0 psig.

- 5.3 **DISCONNECT** Hydraulic Pump Hose and **RECONNECT** to Docking Station.

**CALLOUT:** Obtain permission to open containment vessel door.

- 6.0 **OPEN** CONTAINMENT VESSEL door as follows:

- 6.1 **LOOSEN** four 3-1/2-inch knurled hex nuts to outer end of each stud.

**Note**

**Monitor containment vessel door opening IAW Site Monitoring Plan.**

- 6.2 **PULL** left half of clamp open first and then right half of clamp. **POSITION** the clamps so they do not interfere with CONTAINMENT VESSEL door movement.
- 6.3 **ASSURE** debris pan is positioned to catch any drainage from the opening of the CONTAINMENT VESSEL door.
- 6.4 **COORDINATE** with Monitoring, if required. **CRACK** CONTAINMENT VESSEL door 1 to 3 inches to allow monitoring of CONTAINMENT VESSEL contents.

**CALLOUT:** Announce time when containment vessel door is opened.

- 6.5 **RECORD** time CONTAINMENT VESSEL door opened.
- 6.6 **OPEN** CONTAINMENT VESSEL door just enough to cut the detonator cables. **ALLOW** CONTAINMENT VESSEL door to drip/drain while positioned over debris pan.
- 6.7 **OPEN** CONTAINMENT VESSEL door fully and **USE** a catch tray for any material that may drip from CONTAINMENT VESSEL door inner surface.
- 7.0 **PROCEED** to Procedure 18.

**SPECIAL REQUIREMENTS:**

1. PPE is worn IAW the HASP, if applicable, and/or at discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Flex hoses	as required
Spill containment tray	1 each
Liquid waste drums	as required
Household bleach (5 percent)	as required
Rags	as required
Primary tool kit	1 each
Debris pan	1 each
Debris shield	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 18 SAMPLE AND REMOVE SOLID WASTE

The purpose of this procedure is to collect a representative sample and remove the solid materials remaining within the CONTAINMENT VESSEL.

### PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
2. Receipt of samples has been coordinated with laboratory and courier.
3. Solid waste containers are available.
4. Setup and daily startup checklists have been completed.
5. Decontaminant pail, water pail, and rags are positioned on to EDS Trailer.
6. Initial survey of containment vessel contents must be made by an explosive operator.

### 1.0 **ASSESS** CONTAINMENT VESSEL contents as follows:

- 1.1 **SURVEY** CONTAINMENT VESSEL contents for explosive components and fuzes.

### WARNING

**ALWAYS WEAR LEATHER GLOVES TO PROTECT PPE RUBBER GLOVES WHEN HANDLING FRAGMENTS THAT COULD DAMAGE RUBBER GLOVES. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

- 1.1.1 **PROCEED** to Step 1.2 when no hazardous explosive components or solidified residual agent are discovered.
- 1.1.2 **PROCEED** to Step 8.0 when hazardous explosive components are found or Step 9.0 when solidified residual agent is discovered.

**Caution**

**Do not scratch or otherwise damage containment vessel sealing surfaces when removing debris from containment vessel.**

- 1.2 **REMOVE** large metal fragment pieces and **PLACE** them in solids waste drum. **RECORD** contents of CONTAINMENT VESSEL. **PROCEED** as follows:

**CALLOUT:** Describe contents of residue remaining in CONTAINMENT VESSEL (that is, burster components, fuze functioned, mustard heels, sludge, detonation results, liquid residue). Is the fuze intact? Obtain photographs.

- 1.2.1 **PROCEED** to Step 1.3 when no hazardous explosive components or solidified residual agent are found.

- 1.2.2 **PROCEED** to Step 8.0 when hazardous explosive components are found or Step 9.0 when solidified residual agent is found.

- 1.3 **COLLECT** a representative sample (not less than 5 grams) of the various types of solid materials in CONTAINMENT VESSEL and **PLACE** material in a sample container.

- 1.4 **CLOSE** sample container.

- 1.5 **RECORD** time sample taken and solid sample container number.

**CALLOUT:** Announce solid sample bottle number and time sample taken. Assure Monitoring is aware of sample number.

- 2.0 **PROCESS** sample container as follows:

- 2.1 **WIPE** exterior of sample container with bleach-saturated rag to decontaminate it.

- 2.2 **WIPE** exterior of sample container with water-saturated rag to rinse it.

- 2.3 **PLACE** used rags in waste bag, **PLACE** waste bag into open-head drum, and **ANNOTATE** open-head drum inventory.

- 2.4 **PACK** sample in secondary container/bag.

**Note**

**Monitor item IAW local monitoring program.**

- 2.5 **MONITOR** exterior of sample container to assure it is below criterion for permissible exposure levels. **RECORD** monitoring results.
  - 2.6 **PLACE** packaged sample container into overpack containing absorbent material, **SEAL** overpack, and **CARRY** to the PDS.
  - 2.7 **COMPLETE** chain-of-custody documents (see Annex A, Figures A-3 and A-4), **ATTACH** chain-of-custody documents to packed sample, and **TRANSFER** to courier.
  - 3.0 **REMOVE** remaining solid waste from CONTAINMENT VESSEL as follows:
    - 3.1 **USE** CONTAINMENT VESSEL hoe to **REMOVE** remaining debris from CONTAINMENT VESSEL into debris pan.
    - 3.2 **RECORD** time solid waste removal from CONTAINMENT VESSEL is complete.
- CALLOUT:** Announce time solid waste removal from containment vessel is completed.
- 3.3 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.

**Caution**

**Pieces of metal and debris big enough to pick up and handle should be removed from debris pan and placed in open-head drum designated for solid waste. Debris larger than grit or shavings should not be run through the pan pump because of possible damage to strainer hose.**

- 3.4 **REMOVE** any solid debris from debris pan.

**Note**

**If significant liquid is remaining in debris pan, continue to Step 3.5.  
If not, proceed to Step 6.0.**

- 3.5 **CONNECT** strainer hose to pan pump and **PLACE** strainer hose into debris pan.
- 3.6 **START** pan pump by opening valves 55 and 31.
- 4.0 **RINSE** CONTAINMENT VESSEL and debris pan as follows:
  - 4.1 **RINSE** CONTAINMENT VESSEL interior and debris pan with water.
  - 4.2 **DRAIN** and **RINSE** until debris pan is clean.
  - 4.3 **REMOVE** any remaining liquid from debris pan.
  - 4.4 **STOP** pan pump by closing valves 55 and 31. **REMOVE** strainer hose from debris pan.
  - 4.5 **ASSURE** debris pan is clean and **ALLOW** pan to dry.
- 5.0 **INSTALL** green Teflon®-coated training/shipping metal seal.
- 6.0 **CLEAN** trailer secondary containment pan, as needed, as follows:
  - 6.1 **REMOVE** any debris from trailer secondary containment pan.
  - 6.2 **PLACE** debris in open-head drum.
- 7.0 **PROCEED** to Procedure 19 to clean and prepare equipment.

**ALTERNATE PROCEDURE:**

**WARNING**

**IF ALL EXPLOSIVE COMPONENTS DID NOT EXPLODE AS DESIGNED UPON ATTEMPT TO DETONATE THE MUNITION, SOME COMPONENTS MAY STILL CONTAIN EXPLOSIVES. EXERCISE EXTREME CAUTION WHEN INSPECTING CONTAINMENT VESSEL CONTENTS. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.**

- 8.0 **PERFORM** the following procedures when explosive components and residue are encountered upon opening of CONTAINMENT VESSEL door after munition detonation.
- 8.1 **IDENTIFY** explosive components (that is, burster pieces and fuze initiation charge) not consumed during explosive breach of munition.
  - 8.2 **SEGREGATE** explosive components not consumed during detonation of the munition from other fragments in CONTAINMENT VESSEL.
  - 8.3 **PLACE** remnants of burster and fuze into separate wooden container containing cushioning material.
  - 8.4 **MONITOR** exterior of container, **APPLY** appropriate labels, and **PROCESS** for transfer to a local disposal site for final disposition.
  - 8.5 **PERFORM** one of the following steps:
    - 8.5.1 **RETURN** to Step 1.2 when solidified residual agent is not present.
    - 8.5.2 **PROCEED** to Step 9.0 when solidified residual agent is present.
- 9.0 **PERFORM** the following steps when solidified residual agent is encountered upon opening of CONTAINMENT VESSEL door after munition detonation:
- 9.1 **REMOVE** large metal fragments from inside CONTAINMENT VESSEL and **PLACE** in open-head drum.
  - 9.2 **IDENTIFY** solidified residual agent, that is, mustard heel (crystallized, tar-laden appearance) not consumed during explosive breach of munition.

- 9.3 **SEGREGATE** solidified residual agent from remaining fragments in CONTAINMENT VESSEL with metal tongs and **PLACE** into appropriate shipping container.
- 9.4 **APPLY** appropriate labels and **PROCESS** for transfer to a permitted disposal facility.
- 9.5 **RETURN** to Step 1.3 and **RESUME** normal operations.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW the Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE is to be worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Catch tray	1 each
Spill containment pan	1 each
Debris pan	1 each
Household bleach (5 percent)	as required
Rags	as required
Sample container or secondary container	as required
Chain-of-custody documents	as required
Sample packaging	as required
Wooden box	as required
Open-head drums	as required
Liquid waste drum	as required
Tongs	1 each
Hoe	1 each
Waste bag	as required
Leather gloves	as required
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 19 CLEAN AND PREPARE EQUIPMENT

The purpose of this procedure is to service, clean, and prepare the EDS equipment for the next munition or for final servicing prior to departing the area of operations.

### PRECONDITIONS:

1. PPE to be worn IAW the HASP and/or at discretion of the SSHO.
  2. Air monitoring must be operational.
  3. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
- 1.0 **SERVICE** CONTAINMENT VESSEL and CONTAINMENT VESSEL door as follows:
- 1.1 **VERIFY** CONTAINMENT VESSEL is level with support jack in place.

### Note

**Rags and towels used during this procedure are considered operational waste and should be placed into the same plastic bag used in Step 15.1 for disposal.**

- 1.2 **OBTAIN** and **PRE-POSITION** the following items next to opening side of CONTAINMENT VESSEL:
- Primary tool kit
  - Open-head drum with lid and lid band removed
  - Decontaminant pail with household bleach (5 percent)
  - Rinse pail with water
  - General-purpose detergent
  - Spray bottle
  - Soft-bristle test tube brush
  - Rags or absorbent paper towels
  - Debris pan
  - Nonmetallic scouring pad
  - Scrub brush
  - Large plastic bags
  - Sealable bags
  - Duct tape.

- 1.3 **PRE-POSITION** debris pan under CONTAINMENT VESSEL door.
- 1.4 **PERFORM** gross-decontamination of CONTAINMENT VESSEL and CONTAINMENT VESSEL door by spraying with household bleach or general-purpose detergent.
- 2.0 **REMOVE** O-ring from CONTAINMENT VESSEL door as follows:
  - 2.1 **PRESS** a sharp metal awl into seal ring and pry out.
  - 2.2 **CUT** seal in half, **DECONTAMINATE** and **PLACE** into open-head drum.
  - 2.3 **SPRAY** O-ring groove with household bleach or general-purpose detergent.

**Note**

**Monitor item IAW local monitoring program.**

- 3.0 **REMOVE** Grayloc® seal from CONTAINMENT VESSEL and **RINSE** with water in debris pan. **PLACE** seal in large plastic bag and monitor.
- 4.0 **SCRUB** CONTAINMENT VESSEL interior and **RINSE** with water. **REPEAT** until clean.
- 5.0 **RINSE** CONTAINMENT VESSEL door with water.
- 6.0 **REMOVE** CONTAINMENT VESSEL door components as follows:
  - 6.1 **REMOVE** EXTERIOR DETONATOR SHORTING JACK from HIGH VOLTAGE FLANGE.
  - 6.2 Using 5/16-inch hex key or equivalent wrench, **REMOVE** the four hex-head bolts holding each BLAST SHIELD and BLAST COVER.
  - 6.3 **DECONTAMINATE** with bleach and **RINSE** with water.
  - 6.4 **DRY** components with paper towels.
  - 6.5 **INSPECT** bolts for serviceability.
  - 6.6 **PLACE** unserviceable bolts into sealable bag.



- 7.0 **REMOVE** spray nozzle from top of inside CONTAINMENT VESSEL door as follows:
  - 7.1 Using 3/4-inch deep well or equivalent socket, **REMOVE** spray nozzle from inside top of CONTAINMENT VESSEL door.
  - 7.2 **DECONTAMINATE** with bleach and **RINSE** with water.
  - 7.3 **DRY** components with paper towels.
  - 7.4 **INSPECT** spray nozzle for serviceability.
  - 7.5 **PLACE** unserviceable nozzle into sealable bag.
- 8.0 **REMOVE** dip tubes from bottom and right side of inner CONTAINMENT VESSEL door as follows:
  - 8.1 Using 7/8-inch crow's-foot with extension or equivalent wrench, **REMOVE** both dip tubes from inner CONTAINMENT VESSEL door.
  - 8.2 **DECONTAMINATE** dip tubes with bleach and **RINSE** with water.
  - 8.3 **DRY** components with paper towels.
  - 8.4 **INSPECT** dip tubes for serviceability.
  - 8.5 **PLACE** unserviceable dip tubes into sealable bag.
- 9.0 **REMOVE** INTERIOR DETONATOR JACK as follows:
  - 9.1 **PULL** INTERIOR DETONATOR JACK off interior feedthrough assembly banana plugs, **DECONTAMINATE** jack with bleach, and **RINSE** with water.
  - 9.2 **PLACE** into open-head drum, and **ANNOTATE** open-head drum inventory.
- 10.0 **CLEAN** exposed high voltage feedthroughs as follows:
  - 10.1 **WIPE** soot or debris from each Teflon<sup>®</sup> sleeve, banana plug, and ground rod surface with paper towels, cotton-tipped swabs, or equivalent. **CLEAN** feedthroughs with alcohol, if necessary.
  - 10.2 **DECONTAMINATE** hardware with bleach and **RINSE** with water.
  - 10.3 **DRY** components with paper towels.

10.4 **INSPECT** hardware for serviceability.

10.5 **PLACE** unserviceable hardware into sealable bag.

**Note**

**If replacement of high voltage flange metal seal and O-ring is required, refer to Procedure CNV-21 in the EDS P1U2&3 O&M manual.**

11.0 If necessary, **REMOVE** high voltage feedthroughs from HIGH VOLTAGE FLANGE as follows:

11.1 Using 7/16-inch deep well or equivalent socket, **REMOVE** INTERIOR GROUND ROD/SPIDER assembly from inner CONTAINMENT VESSEL door.

11.2 Using 3/4-inch deep well or equivalent socket, **REMOVE** feedthrough nuts from HIGH VOLTAGE FLANGE.

**Note**

**Two crew members may be required to remove the feedthroughs from the high voltage flange.**

11.3 Using a plastic hammer or equivalent, gently **TAP** inside end of banana plug toward outside of door. Simultaneously **PULL/TWIST** from the outside using pliers on the banana hex plug.

11.4 Using 3/8-inch crow's foot or equivalent wrench, **REMOVE** exterior ground rod base from the HIGH VOLTAGE FLANGE.

11.5 **DECONTAMINATE** hardware with bleach, paying particular attention to the flared feedthrough seal area. **RINSE** with water.

11.6 **DRY** components with paper towels.

11.7 **INSPECT** hardware for serviceability.

11.8 **PLACE** unserviceable hardware into sealable bag.

**Note**

**Monitor item(s) IAW local monitoring program.**

- 12.0 **PLACE** reusable CONTAINMENT VESSEL door parts into sealable bag and monitor.
- 13.0 **PLACE** bag containing expendable/unserviceable CONTAINMENT VESSEL door parts into open-head drum.
- 14.0 **DECONTAMINATE** CONTAINMENT VESSEL door as follows:
  - 14.1 **SPRAY** portholes, threaded holes, and drain and spray nozzle adapters with household bleach or general-purpose detergent.
  - 14.2 **SCRUB** remaining inside surface of CONTAINMENT VESSEL door with nonmetallic scouring pad to remove deposits that may have accumulated.
  - 14.3 **SCRUB** portholes, threaded holes, and drain and spray nozzle adapters using soft-bristle test tube brush. **PAY** particular attention to crevices.
  - 14.4 **CLEAN** residue from O-ring groove using a dry cotton-tipped swab, as needed.
  - 14.5 **CLEAN** CONTAINMENT VESSEL and CONTAINMENT VESSEL door sealing surfaces with nonmetallic scouring pad. **ASSURE** old Perma-Slik® coating is removed.
  - 14.6 **RINSE** CONTAINMENT VESSEL and CONTAINMENT VESSEL door with water.
- 15.0 **CLEAR** sample and drain lines with helium as follows:
  - 15.1 **PLACE** large plastic bag containing bleach-soaked paper towels around circumference of inner CONTAINMENT VESSEL door and **SEAL** with tape.
  - 15.2 **CONNECT** supply hose QS to Q19. **OPEN** valve 19 and then valve 21 until all liquid is removed from vapor sample line.
  - 15.3 **REMOVE** supply hose QS from Q19 and **CONNECT** to Q24. **OPEN** valve 24 and then valve 26 until all liquid is removed from liquid sample line.
  - 15.4 **REMOVE** supply hose QS from Q24 and **CONNECT** to Q22 by use of an adapter.

- 15.5 **OPEN** valve 22 and then valve 23 until all liquid is removed from drain line.
- 15.6 **REMOVE** supply hose QS and adapter from Q24 and **CONNECT** to Docking Station (adapter removed).
- 15.7 **REMOVE** plastic bag from CONTAINMENT VESSEL door and **PLACE** into open-head drum.
- 16.0 **ALLOW** CONTAINMENT VESSEL and CONTAINMENT VESSEL door to dry.
- 17.0 **CLEAN** EDS Trailer contact surfaces as follows:
  - 17.1 **WIPE** all electrical panels (paying close attention to buttons and switches) with bleach-saturated rags. **WIPE DOWN** debris pan and spill containment trays.
  - 17.2 **WIPE DOWN** railings and any other operator-contacted surfaces.
- 18.0 **CLEAN** and **RINSE** debris pan as follows:

**Caution**

**Pieces of metal and debris big enough to pick up and handle should be removed from debris pan and placed in open-head drum designated for solid waste. Debris larger than grit or shavings should not be run through the pan pump because of possible damage to strainer hose.**

- 18.1 **REMOVE** any solid debris from debris pan.

**Note**

**If significant liquid is remaining in debris pan, continue to Step 18.2.  
If not, proceed to Step 19.0.**

- 18.2 **CONNECT** strainer hose to pan pump and **PLACE** strainer hose into debris pan.
- 18.3 **START** pan pump by opening valves 55 and 31.
- 18.4 **RINSE** CONTAINMENT VESSEL interior and debris pan with water.

- 18.5 **DRAIN** and **RINSE** until debris pan is clean.
- 18.6 **REMOVE** any remaining liquid from debris pan.
- 18.7 **STOP** pan pump by closing valves 55 and 31. **REMOVE** strainer hose from debris pan and **DISCONNECT** strainer hose from pan pump.
- 18.8 **ASSURE** debris pan is clean and **ALLOW** pan to dry.
- 19.0 **PERFORM** vinegar rinse of reagent/water lines periodically or when directed IAW EDS P1U2&3 O&M Procedure RSS 5.
- 20.0 **CLEAN** trailer secondary containment pan and platform secondary containment pan as follows:
  - 20.1 **CONNECT** trailer pan waste hose to pan pump, and **OPEN** valves 31 and 33.
  - 20.2 **START** pan pump by opening valve 55.
  - 20.3 **RINSE** trailer secondary containment pan with water when effluent is almost drained out of pan. **CONTINUE** to drain and rinse until pan is clean.
  - 20.4 **TURN OFF** pan pump by closing valve 55. Then **CLOSE** valves 31 and 33.
  - 20.5 **DISCONNECT** trailer pan waste hose from pan pump and **STORE** in designated area.
  - 20.6 **CONNECT** platform pan waste hose to pan pump, and **OPEN** valves 31 and 34.
  - 20.7 **START** pan pump by opening valve 55.
  - 20.8 **RINSE** platform secondary containment pan with water when effluent is almost drained out of pan. **CONTINUE** to drain and rinse until pan is clean.
  - 20.9 **TURN OFF** pan pump by closing valve 55. Then **CLOSE** valves 31 and 34.
  - 20.10 **DISCONNECT** platform pan waste hose from pan pump and **STORE** hose in designated area.

20.11 **ALLOW** EDS secondary containment pans to dry.

20.12 **PLACE** all used rags in open-head drum.

21.0 **EXCHANGE** drum 3 as follows:

21.1 **DISCONNECT** pan waste drum hose from drum 3 at quick-disconnect fitting.

21.2 **REMOVE** quick-disconnect assembly from small bung of drum 3, and **PLACE** bung caps in both waste drum bungs.

21.3 **DISCONNECT** grounding wires from waste drum. **RECORD** final weight of drum 3.

**CALLOUT:** Announce final drum weight.

21.4 **REMOVE** drum 3 from secondary containment. **RECORD** time drum removed.

**CALLOUT:** Announce time drum removed.

21.5 **REPLACE** with empty waste drum. **RECORD** new waste drum label number.

21.6 **INSTALL** quick-disconnect assembly in small bung of replacement waste drum as follows:

21.6.1 **SCREW** 3/4-inch pipe threads of quick-disconnect into small bung of waste drum.

21.6.2 **TIGHTEN** seal ring until hand-tight.

21.7 **CONNECT** pan waste drum hose to quick-connect fitting on replacement waste drum.

21.8 **REMOVE** large bung cap from waste drum.

21.9 **ZERO** scale.

21.10 **RECONNECT** grounding wires to waste drum.

22.0 **COLLECT** liquid sample of decontaminant from decontaminant pail IAW the Sampling and Analysis Plan. **RECORD** sample container label number and time sample collected.

23.0 **DECONTAMINATE** and **PACKAGE** liquid sample container as follows:

- 23.1 **WIPE** exterior of sample container with bleach-saturated rag to decontaminate it.
- 23.2 **WIPE** exterior of sample container with water-saturated rag.
- 23.3 **PLACE** used rags in waste bag, **PLACE** waste bag into open-head drum, and **ANNOTATE** open-head drum inventory.
- 23.4 **PACK** sample in secondary container/bag.

**Note**

**Monitor item IAW local monitoring program.**

- 23.5 **MONITOR** exterior of sample container to assure it is below criterion for permissible exposure levels. **RECORD** monitoring results.
  - 23.6 **PLACE** packaged sample container into overpack containing absorbent material, **SEAL** overpack, and **CARRY** to PDS.
  - 23.7 **COMPLETE** chain-of-custody documents (Annex A, Figures A-3 and A-4), **ATTACH** chain-of-custody documents to packaging, and **TRANSFER** to courier. **RECORD** time of transfer.
- 24.0 **ASSURE** CONTAINMENT VESSEL door is prepared for re-assembly as follows:
- 24.1 **VERIFY** green Teflon<sup>®</sup>-coated training/shipping metal seal is installed to protect CONTAINMENT VESSEL sealing surfaces.
  - 24.2 **POSITION** replacement parts and tools next to CONTAINMENT VESSEL door.
- 25.0 **INSTALL** dip tubes on bottom and right side of inner CONTAINMENT VESSEL door as follows:
- 25.1 Using appropriate crow's-foot or equivalent wrench, **SCREW** dip tubes into threaded fitting at bottom and right side of inner CONTAINMENT VESSEL door.
  - 25.2 **TIGHTEN** until secure.

- 26.0 **INSTALL** spray nozzle at top of inside CONTAINMENT VESSEL as follows:
- 26.1 Using 3/4-inch deep well or equivalent socket, **SCREW** spray nozzle assembly into hole near top of inside CONTAINMENT VESSEL door.
  - 26.2 **TIGHTEN** until secure.
- 27.0 **INSTALL** BLAST SHIELDS except for BLAST COVER on CONTAINMENT VESSEL door as follows:
- 27.1 **HOLD** a BLAST SHIELD against CONTAINMENT VESSEL door interior and **ALIGN** over four bolt holes.
  - 27.2 Using 5/16-inch hex key or equivalent wrench, **SECURE** BLAST SHIELD with four hex screws.
  - 27.3 **REPEAT** Steps 27.1 and 27.2 for the remaining two BLAST SHIELDS and then **PROCEED** to Step 27.4.
  - 27.4 **PLACE** BLAST COVER in designated area until needed.
- 28.0 If necessary, **INSTALL** high voltage feedthroughs as follows:
- 28.1 **BRUSH** Conax<sup>®</sup> Lube onto feedthrough nut threads and area between feedthrough nut and follower.
  - 28.2 **INSERT** high voltage feedthrough into feedthrough ports in HIGH VOLTAGE FLANGE.
  - 28.3 Using 3/4-inch deep well or equivalent socket, **SCREW** feedthrough nut until secure.
  - 28.4 **TORQUE** each feedthrough nut to 25 to 30 ft-lbs.

**Note**

**Do not brush lubricant onto ground rod flat area. Electrical ground path may be degraded.**

- 28.5 **BRUSH** Perma-Slik<sup>®</sup> lube onto EXTERIOR GROUND ROD base threads and **INSTALL** the rod into HIGH VOLTAGE FLANGE.
- 28.6 Using 3/8-inch crow's foot or equivalent wrench, **TORQUE** EXTERIOR GROUND ROD base to 50 inch-pounds.



- 28.7 **BRUSH** Perma-Slik® lube onto INTERIOR GROUND ROD/SPIDER assembly threads.
- 28.8 **SLIDE** INTERIOR GROUND ROD/SPIDER assembly into feedthrough well from inside CONTAINMENT VESSEL door.
- 28.9 Using 7/16-inch deep well or equivalent socket, **SCREW** INTERIOR GROUND ROD/SPIDER assembly until secure.
- 28.10 **TORQUE** to 100 inch-pounds.
- 28.11 **INSTALL** EXTERIOR DETONATOR SHORTING JACK onto HIGH VOLTAGE FLANGE.
- 29.0 **RECORD** name of CONTAINMENT VESSEL door components that were disassembled, decontaminated, and re-assembled.
- 30.0 **RECORD** name of components that were replaced due to unserviceability.

**Note**

**Allow waste drums to cool to ambient temperature before removing interdrum hose and installing bung covers.**

- 31.0 **DISCONNECT** vessel waste barrel hose assemblies from waste drums, **INSTALL** caps on waste barrel hose assemblies, and **POSITION** capped ends of vessel waste barrel hose assemblies in secondary containment.
- 32.0 **PROCEED** to Procedure 2 (Checklists for EDS Setup Procedures) and **PERFORM** one of the following:
  - 32.1 **COMPLETE** Checklist for EDS Pre-Operations and Pre-Operations Checklist for Equipment, Tools, and Supplies in preparation for next munition to be processed.
  - 32.2 **COMPLETE** Checklist for Post-Operations.

**SPECIAL REQUIREMENTS:**

- 1. PPE is to be worn IAW the HASP and/or at the discretion of the SSHO.
- 2. Label sample containers IAW the Sampling and Analysis Plan.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Scrub brush	1 each
Soft-bristle test tube brush	as required
Spray bottle	2 each
General-purpose detergent	as required
Car wash wand	1 each
Rags or absorbent paper towels	as required
Chain-of-custody documents	as required
Sample container	as required
Sample packaging	as required
Household bleach (5 percent)	as required
Liquid waste drums	as required
Open-head drums	as required
Nonmetallic scouring pad	as required
Tape, Teflon® roll	as required
Tape, duct	as required
Bag, plastic, large	as required
Bag, sealable	as required
Debris pan	1 each
Decontaminant pail	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Digital camera	1 each
Swab, cotton tipped	as required
Green Teflon®-coated training/shipping metal seal	1 each

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## PROCEDURE 20 DRAIN SUPPLY TANKS

The purpose of this procedure is to drain the supply tanks as needed. Also, this procedure is used when it is necessary to prepare the EDS for shipment.

### PRECONDITIONS:

1. PPE must be worn IAW the HASP, if applicable, and/or at discretion of the SSHO.
2. Air monitoring must be operational.
3. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.

1.0 **DRAIN** and **RINSE** supply tank(s), if needed, as follows:

1.1 **DRAIN** reagent from tank 2 into original reagent supply drum as follows:

- 1.1.1 **VERIFY** supply tank heaters are off for each supply tank to be drained.
- 1.1.2 **ASSURE** all valves on CONTAINMENT VESSEL door and CONTAINMENT VESSEL door valve panel are CLOSED.

<p style="text-align: center;"><b><u>WARNING</u></b></p>
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<p style="text-align: center;"><b>WEAR APPROPRIATE PPE FOR REAGENT BEING TRANSFERRED.</b></p>
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- 1.1.3 **PLACE** bulk reagent supply drum onto scale located in secondary containment within reach of supply hose.
- 1.1.4 **INSTALL** dip tube and **CONNECT** grounding wire onto reagent supply drum.
- 1.1.5 **CONNECT** supply hose QS to quick-connect on reagent supply drum.
- 1.1.6 **OPEN** valves 17 and 57, and **TRANSFER** chemical reagent from supply tank into reagent supply drum.

- 1.1.7 **CLOSE** valves 17 and 57 to avoid overfilling supply drum or when transfer (gravity feed) is complete.
- 1.1.8 **DISCONNECT** supply hose and grounding wire from reagent supply drum.
- 1.1.9 **REMOVE** reagent supply drum from secondary containment.
- 1.2 **RINSE** tank 2 with water as follows:
  - 1.2.1 **ASSURE** all valves on reagent supply panel, valve panel, CONTAINMENT VESSEL door, and valve 37 are CLOSED.
  - 1.2.2 **DISCONNECT** supply hose from Q15 and **STOW** at Docking Station. **DISCONNECT** pan waste hose from quick-connect on drum 3.
  - 1.2.3 **POSITION** drum 3 as necessary. **DISCONNECT** Vessel Effluent Hose from Q37. **CONNECT** it between Q15 and the quick-connect on drum 3.
  - 1.2.4 **VERIFY** water supply is turned ON, and **OPEN** valves 1 and 5. **START WATER SOURCE PUMP** by opening valve 53.
  - 1.2.5 **CLOSE** valves 53, 1, and 5 when tank 2 contains approximately 20 liters.
  - 1.2.6 **OPEN** valve 17 and **OPEN** valve 57 to start REAGENT SUPPLY PUMP and **TRANSFER** rinse from tank 2 to drum 3.
  - 1.2.7 **STOP** REAGENT SUPPLY PUMP by closing valve 57 when tank 2 is empty.
  - 1.2.8 **CLOSE** valve 17.
  - 1.2.9 **REPEAT** Steps 1.2.4 through 1.2.8 two additional times to thoroughly rinse tank 2. **RECORD** amount of rinsewater transferred.

**CALLOUT:** Announce volume of rinsewater transferred to drum.

- 1.2.10 **DISCONNECT** Vessel Effluent Hose from Q15 and quick-connect on drum 3. **CONNECT** Vessel Effluent Hose between Q37 and Docking Station.
- 1.2.11 **CONNECT** pan waste drum hose between drum 3 and Q31.

1.3 **DRAIN** tank 1 as follows:

- 1.3.1 **ASSURE** valve 34 is CLOSED, platform pan waste hose is connected between Q34 and quick-connect on pan pump, and pan waste drum hose is connected between Q31 and drum 3.
- 1.3.2 **PREPARE** to drain water from tank 1 into platform secondary containment pan by opening valves 15 and 14.
- 1.3.3 **OPEN** valves 34 and 31. **START WATER SUPPLY PUMP** by opening valve 56 and **OPEN** valve 55 to start pan pump.
- 1.3.4 **STOP** pumps by closing valves 56 and 55. **CLOSE** valves 31, 34, 14, and 15.

2.0 **EXCHANGE** drum 3 as follows:

- 2.1 **DISCONNECT** pan waste drum hose from drum 3 at quick-disconnect fitting.
- 2.2 **REMOVE** quick-disconnect assembly from small bung of drum 3, and **PLACE** bung caps in both waste drum bungs.
- 2.3 **DISCONNECT** grounding wires from waste drum. **RECORD** final weight of drum 3.

**CALLOUT:** Announce final drum weight.

- 2.4 **REMOVE** drum 3 from secondary containment. **RECORD** time drum is removed.

**CALLOUT:** Announce time drum removed.

- 2.5 **REPLACE** with empty waste drum. **RECORD** new waste drum label number.
- 2.6 **INSTALL** quick-disconnect assembly in small bung of replacement waste drum as follows:
  - 2.6.1 **SCREW** 3/4-inch pipe threads of quick-disconnect into small bung of waste drum.
  - 2.6.2 **TIGHTEN** seal ring until hand-tight.
- 2.7 **CONNECT** pan waste drum hose to quick-connect fitting on replacement waste drum.

- 2.8 **REMOVE** large bung cap from waste drum.
- 2.9 **ZERO** scale.
- 2.10 **RECONNECT** grounding wires to waste drum.
- 3.0 **PROCEED** to Procedure 2 and **COMPLETE** Checklist for Post-Operations.

SPECIAL REQUIREMENTS:

- 1. PPE is to be worn IAW the HASP and/or at the discretion of the SSHO.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Household bleach (5 percent)	as required
Rags or chemical swipes	as required
Absorbent paper towels	as required
Rinse pail	as required
Decontaminant pail	as required
Spray bottle	as required
General-purpose detergent	as required
Open-head drum	as required
EDS operator log	1 each
Indelible ink pen	1 each

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## PROCEDURE 21 MONITOR AND DECONTAMINATE THE EDS

The purpose of this procedure is to provide operating procedures for monitoring and decontaminating the EDS to acceptable levels for EDS closeout.

### PRECONDITIONS:

1. PPE must be worn IAW the HASP, if applicable, and/or at the discretion of the SSHO.
  2. Air monitoring must be operational.
- 1.0 **VERIFY** EDS equipment has been disassembled, serviced, and re-assembled IAW Procedures 19 and 20.

**CALLOUT:** Announce name of components disassembled and decontaminated.

**CALLOUT:** Announce name of components replaced due to serviceability.

- 2.0 **MONITOR** the CONTAINMENT VESSEL and CONTAINMENT VESSEL door for chemical agent contamination as follows:
- 2.1 **PLACE** plastic sheeting or large bags over CONTAINMENT VESSEL opening and CONTAINMENT VESSEL door.
  - 2.2 **SEAL** the plastic sheeting or bags with duct tape or equivalent.
  - 2.3 **BAG** and **MONITOR** individual items that may have become contaminated during the process of treating a chemical munition in the EDS. These items include:
    - Operational solids waste
    - Tools
    - CONTAINMENT VESSEL hoe
    - PPE
    - Drum fittings
    - Debris and rinse pans
    - Munition loading table.
  - 2.4 **ALLOW** the sealed items to remain undisturbed for 4 hours at a minimum of 21°C (70°F) in a sealed and unventilated condition.
  - 2.5 **PERFORM** monitoring inside the plastic sheeting or bags to determine if further decontamination is necessary.

- 3.0 **DECONTAMINATE** any items with positive results as follows:
- 3.1 **WIPE** contaminated item with 5 percent bleach solution. If item is sensitive to 5 percent bleach solution, **USE** general-purpose detergent.
  - 3.2 **RINSE** item with water, and **ALLOW** item to air dry.
  - 3.3 **PLACE** decontamination waste into open-head drum or liquid waste drum, as required.
  - 3.4 **CLOSE** open-head drum lid.
  - 3.5 **MONITOR** decontaminated item for chemical agent contamination as follows:
    - 3.5.1 **BAG** item and **SEAL** bag.
    - 3.5.2 **ALLOW** bagged item to remain sealed and undisturbed for 4 hours at a minimum of 21°C (70°F) in an unventilated condition.
    - 3.5.3 **MONITOR** inside bag to determine if further decontamination is necessary IAW the Sampling and Analysis Plan and **PROCEED** as follows:
      - 3.5.3.1 **PROCEED** to Step 4.0 when monitoring results show chemical agent is not present.
      - 3.5.3.2 **REPEAT** Steps 3.1 through 3.5.3 to continue decontamination efforts until the item is decontaminated to acceptable levels.

**CALLOUT:** Describe which items were individually bagged, if any, for agent monitoring.



- 4.0 **CLOSE** and **SECURE** CONTAINMENT VESSEL door for transport as follows:

**WARNINGS**

**NEVER ATTEMPT TO GRASP A LEAKING HOSE UNDER PRESSURE WITH HANDS. THE FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY.**

**BECAUSE STRESS MAY DAMAGE HOSE AND CAUSE INJURY, NEVER USE A HOSE TO MOVE EQUIPMENT.**

**WARNING**

**DUE TO POTENTIAL FOR PERSONAL INJURY FROM A RUPTURED HOSE UNDER HYDRAULIC PRESSURE, EXERCISE EXTREME CAUTION WHEN WORKING WITH HYDRAULIC NUTS AND HOSES UNDER HYDRAULIC TENSION.**

- 4.1 **ASSURE** all valves on valve panel, reagent supply panel, and CONTAINMENT VESSEL door are CLOSED.
- 4.2 **PREPARE** sealing surfaces IAW EDS P1U2&3 O&M Procedures, Table 4-2, Pre-Op PMCS No. 3.
- 4.3 **ASSURE** green Teflon<sup>®</sup>-coated training/shipping metal seal has been properly installed.
- 4.4 **ASSURE** clamps are positioned around CONTAINMENT VESSEL so they do not interfere with door movement.

**WARNING**

**CLOSING THE CONTAINMENT VESSEL DOOR PRESENTS CRUSHING OR PINCHING HAZARDS. BE AWARE OF BODY POSITION WHILE PERFORMING THE FOLLOWING STEPS.**

- 4.5 **CLOSE** CONTAINMENT VESSEL door.
- 4.6 **SECURE** CONTAINMENT VESSEL door clamp as follows:
  - 4.6.1 **PUSH** clamp CLOSED, and **ASSURE** hydraulic nuts are fully retracted.
  - 4.6.2 **DON** leather gloves.

**Caution**

**In Step 4.6.3, top and bottom gaps of clamp faces must be within 1/2-inch difference and be closed to less than 1-5/8 inches. Inconsistent gaps may result in improper clamp closure and seal leakage.**

- 4.6.3 **ASSURE** flats on hydraulic nuts are properly aligned.
  - 4.6.4 Evenly **TIGHTEN**, by wrench or hand, the four 3-1/2-inch hex nuts and **ASSURE** top and bottom gaps between clamp faces are less than 1-5/8 inches.
- 5.0 **OPERATE** HYDRAULIC TENSIONER SUBSYSTEM as follows:
  - 5.1 **VERIFY** all four hydraulic nut hoses are securely connected and are not leaking and red Hydraulic Nut Pump OFF button is illuminated.
  - 5.2 **TURN** red PRESSURE switch to LOW.
  - 5.3 **PRESS** green ON button on Hydraulic Nut Pump panel to start hydraulic pump and **MONITOR** all four hydraulic nuts.

**WARNING**

**NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH THREADED RODS WHEN TENSIONER IS UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

- 5.4 **VERIFY** all personnel are clear of hydraulic nut and hydraulic hoses.

**Caution**

**Do not exceed 1,200 psig hydraulic pump pressure to avoid possible damage to sealing surfaces during movement.**

- 5.5 **PUSH** ADVANCE button on Hydraulic Nut Pump panel until pressure reaches 1,000 psig and then **RELEASE** ADVANCE button.
- 5.6 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 5.7 **PUSH** and **HOLD** RETRACT button on Hydraulic Nut Pump panel to release hydraulic pressure.
- 5.8 **VERIFY** that pump pressure gauge reads approximately 0 psig.
- 6.0 **STOP** HYDRAULIC TENSIONER SUBSYSTEM as follows:
- 6.1 **PRESS** red OFF button on Hydraulic Nut Pump panel to stop hydraulic pump and **PRESS** red OFF button on VESSEL ROTATION CONTROL PANEL.
- 6.2 **REMOVE** INTERLOCKS and VESSEL ROTATION CONTROL KEYS.
- 7.0 **SECURE** VESSEL SUPPORT JACK in down position to prevent movement during transport.

- 8.0 **LABEL** all waste with proper labeling IAW the protocol of the laboratory and all local and federal requirements as follows:

**Note**

**Refer to the Sampling and Analysis Plan for labeling details.**

- 8.1 **COMPLETE** required chain-of-custody documents (Annex A, Figures A-3 and A-4).
- 8.2 **ATTACH** chain-of-custody documents to packed sample.
- 9.0 **PROCEED** to Procedure 22.

**SPECIAL REQUIREMENTS:**

1. Buddy system must be used for safety.
2. Bleach solution can be corrosive to metal. Thoroughly rinse metal surfaces, allow to dry, and lubricate (if necessary) after being decontaminated.
3. All waste generated during EDS closeout must be properly packaged and analyzed.

**EQUIPMENT, TOOLS AND SUPPLIES:**

<b><u>ITEM:</u></b>	<b><u>QUANTITY:</u></b>
Bleach solution (5 percent)	as required
Water	as required
General-purpose detergent	as required
Absorbent towels	as required
Scrub brushes	as required
Waste containers	as required
Plastic bags	as required
Duct tape or equivalent	as required
Plastic sheeting	as required
Open-head drum(s)	as required
EDS operator log	1 each
Indelible ink pen	1 each
Green Teflon®-coated training/shipping metal seal	1 each

---

## **PROCEDURE 22**

### **BREAK DOWN EDS OPERATIONS AREA**

The purpose of this operation is to provide a checklist (Table 22-1) that can be used as a job performance aid to assist operators in removing EDS supplies and components from the operations area.

#### **PRECONDITIONS:**

1. Procedure 21 (Monitor and Decontaminate the EDS) of this SOP has been completed.
2. PPE is worn IAW the HASP when appropriate.

Table 22-1. Checklist for EDS Closeout

#	ACTIVITY	See Table 4-8 in the EDS P1U2&3 O&M Manual	Yes	No
1.	<b>COORDINATE</b> with site Safety and Monitoring personnel to determine level of decontamination necessary in accordance with (IAW) Site Monitoring Plan (SMP).	N/A		
2.	<b>DISASSEMBLE</b> EDS containment vessel door components IAW Procedure 19.	N/A		
3.	<b>CLEAN</b> containment vessel door components IAW Procedure 19.	N/A		
4.	<b>REASSEMBLE</b> containment vessel door IAW Procedure 19.	N/A		
5.	<b>DECONTAMINATE</b> contaminated areas to approved levels IAW SMP.	N/A		
6.	<b>COORDINATE</b> with Monitoring to assure decontamination level has been obtained IAW Department of the Army Pamphlet 385-61.	N/A		
7.	<b>COMPLETE</b> Firing System shutdown.	EDS Closeout Procedure No. 1		
8.	<b>DISASSEMBLE</b> and <b>SECURE</b> leak detection equipment for transport.	EDS Closeout Procedure No. 2		
9.	<b>FLUSH</b> and <b>DRAIN</b> Reagent Supply System.	EDS Closeout Procedure No. 3		
10.	<b>OPEN</b> containment vessel door.	EDS Closeout Procedure No. 4		
11.	<b>INSPECT</b> for internal containment vessel damage.	EDS Closeout Procedure No. 5		
12.	<b>DISCONNECT</b> water supply from trailer.	EDS Closeout Procedure No. 6		
13.	<b>DISCONNECT</b> air supply from trailer.	EDS Closeout Procedure No. 7		
14.	<b>CLOSE</b> containment vessel door for shipment.	EDS Closeout Procedure No. 8		
15.	<b>INSPECT</b> Hydraulic Nut System.	EDS Closeout Procedure No. 9		
16.	<b>DISASSEMBLE</b> Reagent Supply System.	EDS Closeout Procedure No. 10		
17.	<b>DISASSEMBLE</b> Waste Transfer Subsystem.	EDS Closeout Procedure No. 11		
18.	<b>DISCONNECT</b> electrical power from trailer.	EDS Closeout Procedure No. 12		
19.	<b>INSPECT</b> containment vessel support and motor mount assemblies.	EDS Closeout Procedure No. 13		

Table 22-1. Checklist for EDS Closeout (Continued)

#	ACTIVITY	See Table 4-8 in the EDS P1U2&3 O&M Manual	Yes	No
20.	<b>INSTALL</b> containment vessel shipping brace and tie-down straps.	EDS Closeout Procedure No. 14		
21.	<b>FOLD UP</b> and <b>SECURE</b> Reagent Supply Platform.	EDS Closeout Procedure No. 15		
22.	<b>FOLD UP</b> trailer stairs.	EDS Closeout Procedure No. 16		
23.	<b>REPLACE</b> tarp on EDS Trailer.	EDS Closeout Procedure No. 17		
24.	<b>CONNECT</b> tow vehicle to EDS Trailer.	EDS Closeout Procedure No. 18		
25.	If waste has been removed, <b>BREAK DOWN</b> waste staging area.	N/A		
26.	<b>PACKAGE</b> remaining supplies, equipment, and tools for transport.	N/A		
27.	<b>CERTIFY</b> EDS Trailer and equipment are decontaminated for transport.	N/A		
28.	<b>COORDINATE</b> with Site Manager prior to vacating the EDS site.	N/A		

Signature: EDS Crew Supervisor

Date

SPECIAL REQUIREMENTS:

1. This checklist must be used by EDS crew members that are trained in all aspects of EDS operations.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

QUANTITY:

Clipboard

as required

Indelible ink pen

as required

EDS O&M Manual

1 each

EDS operator log

1 each



---

## **ANNEX A FORMS**







MATERIEL COURIER RECEIPT		SHIPPER'S CONTROL/DOCUMENT NO.	PRIVACY ACT STATEMENT			
SHIPPER		SUPPLY ACCOUNT NUMBER	AUTHORITY 5 U.S.C., Sec 552a (PL 93-579) PRINCIPLE PURPOSES: To provide a receipt for transfer of controlled material. The use of the SSAN is required and is necessary to provide positive identification of the individuals receiving for the material. ROUTINE USES: To document transfer of materiel from a shipper to a courier, courier to courier and/or receiver. DISCLOSURE IS VOLUNTARY: Since the SSAN must be used, refusal to provide SSAN may be grounds for action to remove the individual concerned from duties involving the material transferred by use of this form.			
DESTINATION		SUPPLY ACCOUNT NUMBER				
I certify by my signature that I have received the materiel listed on this form and am aware of the applicable safety and security requirements.						
SHIPMENT TRANSFERS			SHIPMENT DESCRIPTION			
	LOCATION OF TRANSFER	DATE (YR/MO/DAY)	LINE NUMBER	QUANTITY	SERIAL NUMBERS	REMARKS
FIRST						
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
SECOND						
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
THIRD						
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
FOURTH						
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
FIFTH						
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				

DD FORM 1911, MAY 82

PREVIOUS EDITION MAY BE USED UNTIL 31 DEC 82.

04-32-012/d1911for odr  
06/10/99

USAPPC V1.01

Figure A-3. DD Form 1911, Material Courier Receipt Form

# CBARR

## Analysis Request Form

MB-FORM 55 Revision 2, November 2001

ANALYTE LIST\*: GB, GD, VX, HD, L, GA, GF, HN-1, DIMP, DMMP, MPA, EMPA, IMPA, PMPA, 1,4-Dithiane, 1,4-Thioxane, Thiodiglycol

\* Additional analytes available upon request

GOV'T POC/ORG: (responsible for project)

CONTACT POC:(responsible for samples/results)

ORGANIZATION:

ADDRESS:

Phone #:( ) - Fax #:( ) -

EMAIL:

PAGE \_\_\_\_ OF \_\_\_\_

PROJECT NAME/LOCATION:

ANALYTES REQUESTED FOR ANALYSIS

SAMPLER(S)/Company:

COLLECTION  
DATE

SAMPLE NAME

MATRIX

COMMENTS

☐ Observed Suspect Contamination (Check box to indicate high probability of chemical warfare agent presence, e.g. visible liquid, leaking munition, etc.)

DISCLAIMER: This form is not to supercede a formal chain of custody (COC) document. Fill out this form, as completely as possible, and include a copy with each shipment of extraction samples. List all analytes requested for monitoring. Fill out POC section, so results can be sent as soon as received.

NOTE: You do not need to fill out this form, if your COC document includes all of the information requested on this form.

Figure A-4. Request for Analysis (Sheet 1 of 2)

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**DIRECTIONS FOR USE OF THE CBARR  
ANALYSIS REQUEST FORM  
MB-FORM 55**

The following directions shall be used to properly fill out the Analysis Request Form for submission to the CBARR Monitoring Branch laboratory. The form shall not be misinterpreted as a chain of custody form, rather, the form shall be used to allow the laboratory to know exactly what analysis needs to be conducted, proper reporting of results and proper invoicing to the customer. Please review these directions and the example form prior to submitting an MB-FORM 55.

- The "GOV'T POC" contains the name of the government individual responsible for the project directing the sampling activities.
- The "GOV'T ORG" contains the name of the government organization for the person listed in the POC section above. This is very important for proper invoicing of the sample analysis.
- The "Contact POC" is the name of the person responsible for receiving the final results and the sample themselves. This person is not necessarily the same as the GOV'T POC.
- The Organization, Address, Phone, FAX and email is critical information for proper reporting and archival. It is important to fill out this section each time a sample is submitted to ensure that the information remains the same in our database.
- The "Project Name/Location" is specific to where and why the samples were collected.
- "Sampler(s)/Company" refers to the person that took the samples and indicates the company of the sampler. This person may be different than the person indicated in the "Contact POC" section.
- Enter the "Collection Date", "Sample Name" and "Matrix" columns with the same information as the chain of custody documentation. This information will be checked prior to acceptance to the ECBC Monitoring Branch laboratory. The Monitoring Branch will request corrected paperwork prior to beginning analysis on any samples.
- The "Analytes Requested for Analysis" section shall be filled in with the desired analyte and then marked in the row corresponding to the sample name. Each column does not necessarily have to have the same analytes requested. A box containing an analyte list is provided and additional compounds can be requested after contacting the Monitoring Branch.
- Several sections are also provided to add comments to the laboratory personnel or general comments concerning the samples.

Figure A-4. Request for Analysis (Sheet 2 of 2)





TO: <i>(Forward direct to addressee listed in publication)</i>				FROM: <i>(Activity and location) (Include ZIP Code)</i>			DATE	
<b>PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>								
PUBLICATION NUMBER				DATE		TITLE		
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<b>PART III - REMARKS</b> <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE	

USAPA V3.01

Figure A-5. Recommended Changes to Publications and Blank Forms (Sheet 2 of 2)

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## **ANNEX B**

# **EXPLOSIVE DESTRUCTION SYSTEM PROCESS ALARMS**



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## ANNEX B

### EXPLOSIVE DESTRUCTION SYSTEM PROCESS ALARMS

Each of the conditions listed in Table B-1 will trigger an audible alarm buzzer. The alarm is programmable for duration and interval. The initial programming is 3 seconds of beeps, repeated every minute until the alarm is acknowledged or the condition is corrected. The alarm buzzer volume is adjustable from approximately 85 to 115 decibels. Also, an indicator light on a panel will illuminate until fault is corrected.

Table B-1. Process Alarm Conditions

Fault	Location	Cause	Immediate Action
Vessel Over-Temperature	Vessel Control Panel	Shuts down containment vessel heater and turns on red light on vessel control panel. Containment vessel temperature has exceeded upper temperature limit.	Check containment vessel temperature limit and setpoint controller for correct temperature settings. Refer to EDS Phase 1 Units 2 and 3 (P1U2&3) Operations and Maintenance (O&M) Manual.
Tank 1 Over-Temperature	Process Control Panel	Shuts down tank 1 heater and turns on red light on process control panel. Tank 1 temperature has exceeded upper temperature limit.	Check containment vessel temperature limit and setpoint controller for correct temperature settings. Refer to EDS P1U2&3 O&M Manual.
Tank 2 Over-Temperature	Process Control Panel	Shuts down tank 2 heater and turns on red light on process control panel. Tank 2 temperature has exceeded upper temperature limit.	Check containment vessel temperature limit and setpoint controller for correct temperature settings. Refer to EDS P1U2&3 O&M Manual.
Tank 1 Low Fluid Level	Process Control Panel	Shuts down tank 1 heater and turns on red light on process control panel. Fluid level in tank 1 is below thermocouple that controls temperature.	Close valves 15 and 56. Check tank fluid level. Refill and turn on tank heater, if necessary. If alarm continues, refer to EDS P1U2&3 O&M Manual.
Tank 2 Low Fluid Level	Process Control Panel	Shuts down tank 2 heater and turns on red light on process control panel. Fluid level in tank 2 is below thermocouple that controls temperature.	Close valves 17 and 57. Check tank fluid level. Refill and turn on tank heater, if necessary. If alarm continues, refer to EDS P1U2&3 O&M Manual.
Radio Frequency Signal Fault	Utility Panel	Turns on amber light on utility panel. Indicates loss of radio frequency signal from containment vessel.	Replace lithium ion batteries.

Table B-1. Process Alarm Conditions (Continued)

Fault	Location	Cause	Immediate Action
Rupture Disc Ruptures	Process Control Panel	Turns on red light on process control panel. Indicates that the overpressure rupture disc on drum 1 or 1A ruptured.	Close all valves (except valve 23) on containment vessel door and valve panel. Close valves 18 and 37. Replace rupture disc assembly in accordance with (IAW) EDS P1U2&3 O&M Manual, Chapter 5, Procedure WTS-3.
Valve 27 Closed	Reagent Supply Panel	Turns on red light on reagent supply panel. Indicates that the overpressure rupture disc on drum 1 or 1A ruptured.	Close valve(s) 18 and/or 37. a. Check process control panel to see whether disc failure light is illuminated. If illuminated, refer to rupture disc function fault or proceed to Step b. b. Verify rupture disc electrical cables are properly connected. Reconnect if necessary. Check rupture discs for serviceability. Replace defective rupture disc assembly IAW EDS P1U2&3 O&M Manual, Chapter 5, Procedure WTS-3.
Drive Fault	Vessel Control Panel	Turns on red light on vessel control panel. Indicates drive motor cooling fan or controller may be at fault. Depending on fault, automatic rotation drive may or may not stop.	Push Drive Fault Reset button. If Drive Fault Reset button continues to flash on and off, check Motor Terminal Box and vessel rotation: a. Motor Terminal Box. See if red light-emitting diode is illuminated. If red light-emitting diode is not illuminated, immediately provide alternate cooling source for drive motor. <b>DO NOT OPERATE DRIVE MOTOR FOR MORE THAN 15 MINUTES WITHOUT COOLING DRIVE MOTOR!!</b> b. Containment Vessel Rotation. When containment vessel rotation is not normal, halt containment vessel rotation. Push Vessel Rotation Control OFF button and then ON button to reset controller. Start containment vessel rotation. If containment vessel rotation is still not normal, refer to Annex D for rotation pendant operation. Complete processing in manual mode by use of vessel rotation control pendant.

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## **ANNEX C**

# **LABORATORY SAMPLE BOTTLE EXTRACTION PROCEDURE**





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**ANNEX C**  
**LABORATORY SAMPLE BOTTLE EXTRACTION PROCEDURE**

**Tools Required - 5/8-inch open end wrench**  
**Adjustable wrench or equivalent to hold valve body**  
**VCR union/coupler, 1 each**  
**Gas chromatograph septum**  
**Needle (used to relieve pressure in the bottle)**

**Liquid Sample Bottle Extraction Procedure:**

1. Ensure all necessary parts are on hand for this procedure before beginning.
2. Inside fume hood, clamp the sample bottle assembly into a sturdy device (that is, ring stand, vise, or any available clamping device).
3. Install a new gas chromatograph septum into one side of the VCR union.
4. Remove the VCR cap from the sample bottle assembly using the two wrenches. Discard the contaminated metal gasket appropriately.

**Caution**

**For the following steps finger-tighten ONLY. DO NOT tighten with a wrench.**

5. Install the VCR union with previously installed septum onto the sample bottle assembly.
6. Insert the needle into the septum. You may wish to position a toxic vent near the union for the venting process.

**WARNING**

**POINT THE NEEDLE AWAY FROM CREW MEMBERS WHEN RELIEVING THE PRESSURE IN THE BOTTLE. AS MUCH AS 100 POUNDS PER SQUARE INCH PRESSURE COULD BE CONTAINED IN THE SAMPLE BOTTLE ASSEMBLY. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

- 
7. Carefully and slowly, open the sample bottle assembly valve to relieve the pressure in the valve.
  8. Close the sample bottle assembly valve.
  9. Using the two wrenches, remove the sample bottle from the valve body.
  10. Remove the contaminated valve body to an appropriate place.
  11. The sample bottle is now ready for removal of the liquid and analysis.

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**ANNEX D**  
**VESSEL ROTATION CONTROL PENDANT**  
**OPERATION**



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## ANNEX D VESSEL ROTATION CONTROL PENDANT OPERATION

### Caution

**When using the vessel rotation control pendant to rotate the containment vessel, verify the support jack is in the DOWN position to avoid damage to the containment vessel or support jack.**

- 1.0 **PREPARE** to rotate CONTAINMENT VESSEL using VESSEL ROTATION CONTROL PENDANT as follows:
  - 1.1 **VERIFY** Rotation Control Key in AUTO/OFF/MAN switch is turned to MAN position.
  - 1.2 **CONNECT** VESSEL ROTATION CONTROL PENDANT to PENDANT connector on VESSEL CONTROL PANEL.
- 2.0 **ROTATE** ROTARY AGITATION SUBSYSTEM in clockwise direction as follows:

### WARNING

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

### Caution

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

- 2.1 **INSERT** Rotation Control Key in AUTO/OFF/MAN switch and **TURN** to MAN position (green MANUAL READY light and red HALT button illuminate).

---

**Note**

**Rotation may be stopped at any time by pushing STOP button on vessel rotation control pendant.**

2.2 **PUSH** FWD button on VESSEL ROTATION CONTROL PENDANT to start CONTAINMENT VESSEL clockwise rotation.

2.3 **RECORD** CONTAINMENT VESSEL rotation start time.

**CALLOUT: Announce time containment vessel rotation started.**

2.4 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.

3.0 **STOP** ROTARY AGITATION SUBSYSTEM as follows:

3.1 **PUSH** STOP button on VESSEL ROTATION CONTROL PENDANT to stop CONTAINMENT VESSEL rotation.

3.2 **RECORD** rotation stop time.

**CALLOUT: Announce time rotation halted.**

- 
- 4.0 **ROTATE** ROTARY AGITATION SUBSYSTEM in counterclockwise direction as follows:

**WARNING**

**EDS CREW SUPERVISOR MUST ASSURE THAT PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.**

**Caution**

**Loose tools or other hardware left on top of or underneath the rotating containment vessel may be damaged.**

**Note**

**Rotation may be stopped at any time by pushing STOP button on vessel rotation control pendant.**

- 4.1 **PUSH** REV button on VESSEL ROTATION CONTROL PENDANT to start CONTAINMENT VESSEL counterclockwise rotation.
- 4.2 **RECORD** CONTAINMENT VESSEL rotation start time.

**CALLOUT: Announce time containment vessel rotation started.**

- 5.0 **STOP** ROTARY AGITATION SUBSYSTEM as follows:

- 5.1 **PUSH** STOP button on VESSEL ROTATION CONTROL PENDANT to stop CONTAINMENT VESSEL rotation.
- 5.2 **RECORD** rotation stop time.

**CALLOUT: Announce time rotation halted.**

---

6.0 **JOG** CONTAINMENT VESSEL to desired position as follows:

- 6.1 **JOG** CONTAINMENT VESSEL clockwise by pushing FWD JOG button on VESSEL ROTATION CONTROL PENDANT and **RELEASE** button when desired position is reached.
- 6.2 **JOG** CONTAINMENT VESSEL counterclockwise by pushing REV JOG button on VESSEL ROTATION CONTROL PENDANT and **RELEASE** button when desired position is reached.

7.0 **STOP** ROTARY AGITATION SUBSYSTEM as follows:

- 7.1 **TURN** Vessel Rotation Control Key to OFF position and **REMOVE** Vessel Rotation Control Key.

8.0 **DISCONNECT** VESSEL ROTATION CONTROL PENDANT from PENDANT connector on VESSEL CONTROL PANEL.



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## **ANNEX E**

### **OLD STYLE FRAGMENT SUPPRESSION SYSTEMS**



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## ANNEX E OLD STYLE FRAGMENT SUPPRESSION SYSTEMS

### Note

Old style Fragment Suppression Systems (FSSs) come in three different styles and require four similar, but specific, configurations to accommodate the following:

- a. 75-millimeter (mm) shell (Figure E-1)
- b. Livens projectile (Figure E-2)
- c. 4.2-inch mortar (Figure E-3)
- d. Typical munition (Figure E-4).

- 1.0 **SELECT** old style FSS assembly and explosive charges for munition to be treated.
  - 1.1 **REMOVE** FSS assembly from shipping container.
  - 1.2 **CHECK** serviceability and **ASSURE** completeness of FSS assembly as follows:
    - 1.2.1 Cylinder bottom securely attached to frame at four locations.
    - 1.2.2 Stopper block captured by frame tabs and positioned between frame and cylinder bottom.
    - 1.2.3 Munition holder positioned in cylinder bottom.
    - 1.2.4 Munition roll pin (75mm shell only) for indexing munition in place in cylinder bottom (4.2-inch mortar and Livens projectile are indexed by munition holder tabs).
    - 1.2.5 Linear-shaped charge (LSC) brackets securely attached to cylinder bottom.
    - 1.2.6 Roll pins in four corners of cylinder bottom.
    - 1.2.7 Cylinder top.
    - 1.2.8 Endplates (front and back) of appropriate size.
    - 1.2.9 Optional strain relief clips (binder clips).

---

**Note**

**Generally, aft end of frame/cylinder bottom assembly is positioned facing rear end of containment vessel and forward end is positioned facing containment vessel door.**

- 1.3 **POSITION** frame/cylinder bottom assembly on LOADING TABLE so that munition holder tabs (long end for 75mm shell and 4.2-inch mortar, short end for Livens projectile) are facing rear of CONTAINMENT VESSEL.
- 1.4 **CHECK** serviceability and **ASSURE** completeness of FSS explosive items as follows:
  - 1.4.1 LSC
  - 1.4.2 LSC detonator assemblies, two each, RP-1.

**Note**

**The M139 bomblet FSS requires only one conical-shaped charge (CSC).**

- 1.4.3 CSC, two each, fitted with O-rings.
- 1.4.4 CSC detonator assemblies, two each, RP-2.
- 1.4.5 **INSPECT** detonators, CSCs, and LSC. **REPLACE** damaged component(s) from expendable supplies.
- 1.4.6 **PLACE** O-ring onto nipple of each CSC, if necessary.
- 1.4.7 **PLACE** items back into shipping container until final FSS assembly.
- 1.4.8 **POSITION** cylinder top next to LOADING TABLE.
- 1.4.9 **RECORD** when pre-positioning of FSS cylinder top and frame/cylinder bottom assembly onto EDS Trailer is completed.

**CALLOUT: Announce time FSS cylinder top and frame/cylinder bottom assembly are pre-positioned onto EDS Trailer.**

- 2.0 **ASSEMBLE** FSS for munition type as follows:
  - 2.1 **PROCEED** to Step 3.0 for 75mm shell.

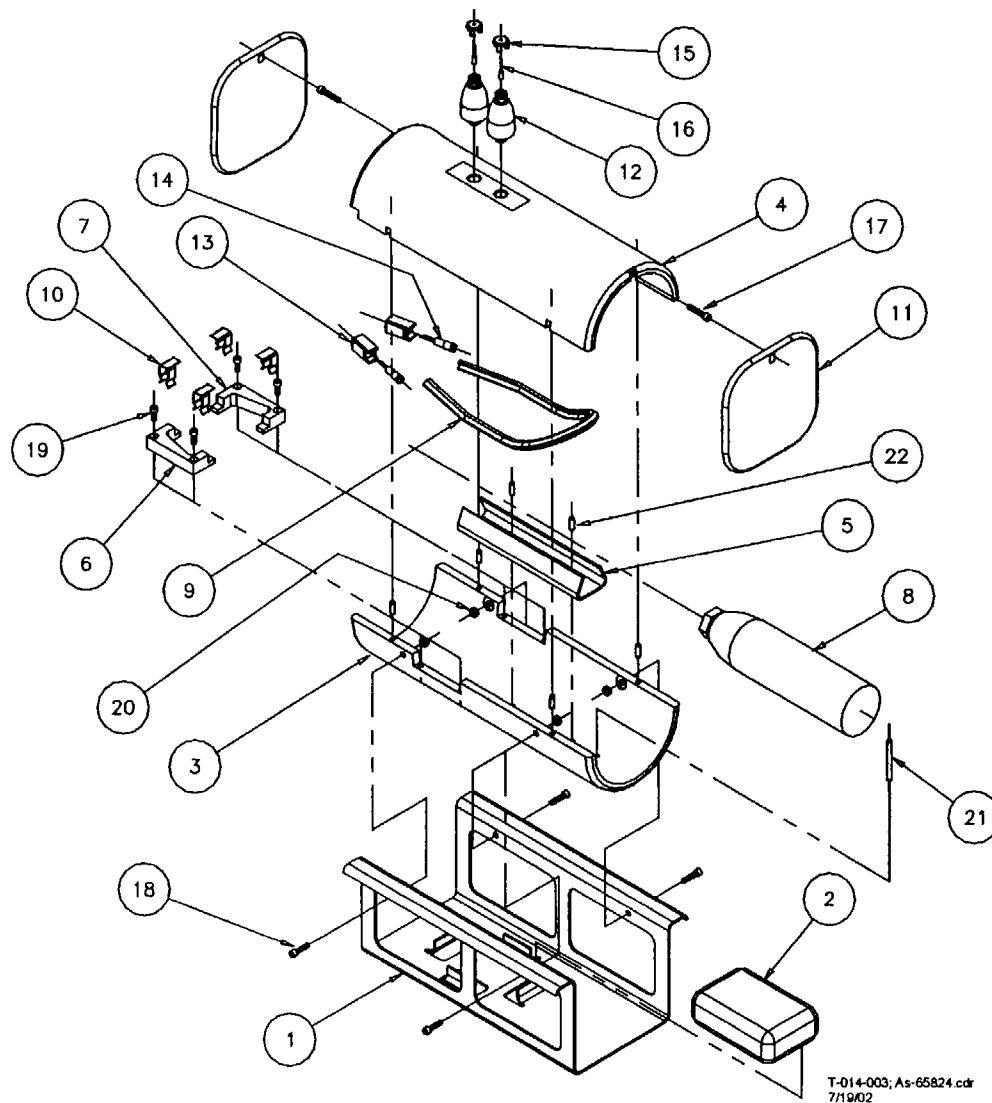
- 
- 2.2 **PROCEED** to Step 4.0 for Livens projectile.
  - 2.3 **PROCEED** to Step 5.0 for 4.2-inch mortar.
  - 2.4 **PROCEED** to Step 6.0 for other types of munitions.
  - 3.0 **PERFORM** the following steps to load the 75mm shell into the FSS:
    - 3.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
    - 3.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 3.3. If not, **PERFORM** the following:
      - 3.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

#### Notes

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset capacitor discharge unit (CDU) (CH1 through CH4).**

- 3.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.
- 3.3 **PLACE** 75mm shell onto munition holder so it rests securely in holder with aft end of munition against indexing roll pin in cylinder bottom. Tapered end will be coincident with the LSC brackets (Figure E-1).
- 3.4 **POSITION** LSC on top of munition with open ends pointed toward nose and resting in LSC brackets.



- 1 - Frame
- 2 - Stopper Block
- 3 - Cylinder Bottom
- 4 - Cylinder Top
- 5 - Munition Holder
- 6 - LSC Bracket, Left
- 7 - LSC Bracket, Right
- 8 - 75mm Shell
- 9 - LSC, 75mm
- 10 - LSC Retaining Clip
- 11 - End Plate, 7 inch
- 12 - CSC
- 13 - LSC Detonator Clip
- 14 - RP-1 EBW Detonator
- 15 - CSC Detonator Clip
- 16 - RP-2 EBW Detonator
- 17 - .25 x 20 UNC x 1.25 LG SH Cap Screw
- 18 - .25 x 20 UNC x 1.00 LG SH Cap Screw
- 19 - .25 x 20 UNC x 0.625 LG SH Cap Screw
- 20 - .25 x 20 UNC
- 21 - Ø.25 x 2.50 LG Roll Pin
- 22 - Ø.25 x 0.75 LG Roll Pin

Figure E-1. 75mm Shell Old Style FSS

---

**Note**

**Retaining clips hold LSC in place.**

- 3.5 **SECURE** LSC ends with four LSC retaining clips pushed onto LSC bracket legs.

**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 3.6 **SECURE** RP-1 detonators to each end of LSC by sliding a detonator clip on each end of LSC.
- 3.7 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in cylinder top.
- 3.8 **LOWER** cylinder top onto cylinder bottom with drilled holes facing toward nose end of munition.
- 3.9 **VERIFY** that two cylinder halves align along entire seam.
- 3.10 **VERIFY** that stopper block is positioned directly beneath CSCs. If it is not, **DO NOT USE** FSS assembly.

**Note**

**Whenever two plates are used on one end of the FSS, the first plate is taped to the FSS and the second the plate is suspended on the pin, with a gap between the plates.**

- 3.11 **SUSPEND** rear endplate(s) onto assembled FSS. **PLACE** O-ring onto nipple of each CSC, if necessary.
- 3.12 **ATTACH** an RP-2 detonator assembly clip to each CSC.
- 3.13 **PUSH** CSCs into holes in cylinder top until seated firmly against machined surface. **SECURE** with tape as needed.

**CALLOUT: Obtain photographs.**

- 3.14 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.

- 
- 3.15 **COIL** detonator wires and **ATTACH** strain relief clips, if needed.
  - 3.16 **INSPECT** the munition and explosive components for proper configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
  - 3.17 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.
  - 3.18 **RECORD** time FSS assembly is complete and **PROCEED** to Step 7.0.

**CALLOUT:** Announce time FSS assembly is complete.

- 4.0 **PERFORM** the following steps to load the Livens projectile in the FSS:
  - 4.1 **POSITION** LSC on LSC bracket with overlapped detonator ends pointed outward next to longer end of two munition holder tabs (Figure E-2).
  - 4.2 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 4.3 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 4.4. If not, **PERFORM** the following:
    - 4.3.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

#### Notes

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 4.3.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.



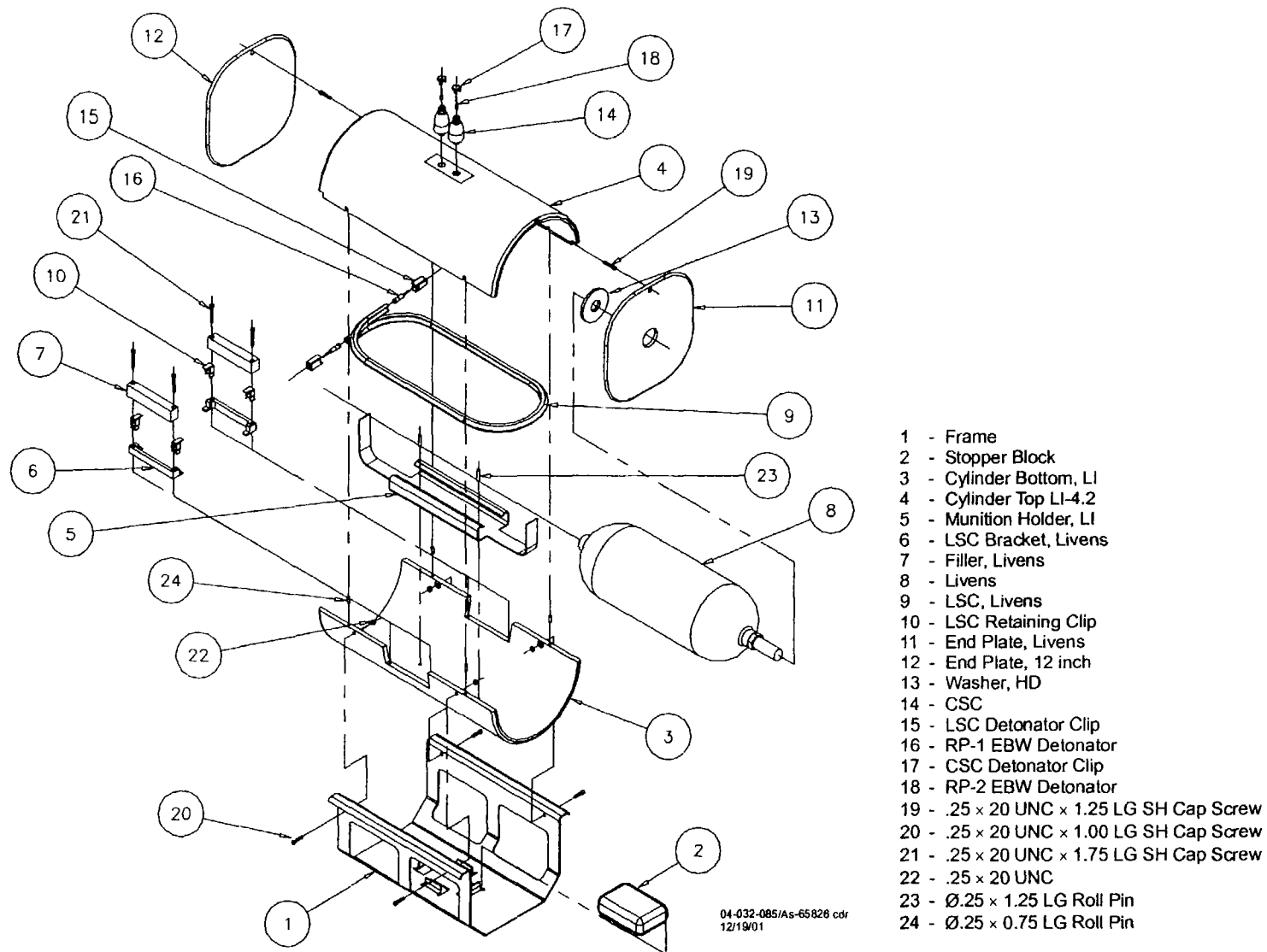


Figure E-2. Livens Projectile Old Style FSS

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**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 4.4 **SECURE** RP-1 detonator to each end of LSC by sliding a detonator clip onto each end of LSC.

**Note**

**Retaining clips hold LSC in place.**

- 4.5 **SECURE** LSC ends with four LSC retaining clips pushed onto LSC bracket legs.
- 4.6 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in cylinder top.

**Note**

**Munition holder tabs provide exact positioning.**

- 4.7 **PLACE** Livens projectile onto munition holder so it rests securely in holder with nose end facing rear of CONTAINMENT VESSEL.

**CALLOUT: Obtain photographs.**

- 4.8 **LOWER** cylinder top onto cylinder bottom until the two cylinder halves align along the entire seam.
- 4.9 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.

**Note**

**Whenever two endplates are used on each end of the FSS, the first plate is taped to the FSS and the second plate is suspended on the pin, with a gap between the two plates.**

- 4.10 **SUSPEND** rear endplate(s) onto assembled FSS. **PLACE** O-ring onto nipple of each CSC, if necessary.

- 
- 4.11 **ATTACH** an RP-2 detonator assembly clip to each CSC.
  - 4.12 **PUSH** CSCs into holes in cylinder top until seated firmly against machined surface. **SECURE** with tape as needed.
  - 4.13 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
  - 4.14 If desired, **COIL** detonator wires and **ATTACH** strain relief clips.
  - 4.15 **INSPECT** munition and explosive components for configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
  - 4.16 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.
  - 4.17 **RECORD** time FSS assembly is complete and **PROCEED** to Step 7.0.

**CALLOUT:** Announce time FSS assembly is complete.

- 5.0 **PERFORM** the following steps to load the 4.2-inch mortar into the FSS:
  - 5.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 5.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 5.3. If not, **PERFORM** the following:
    - 5.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

### Notes

**LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.**

**Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).**

- 5.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.

- 
- 5.3 **PLACE** 4.2-inch mortar onto munition holder so it rests securely in holder with aft end of munition against holder tab. (Munition holder tab at aft end provides exact positioning.) Tapered end of munition will be coincident with the LSC brackets (Figure E-3).
- 5.4 **POSITION** LSC so it extends along centerline of the munition with open ends pointed toward nose and resting in LSC brackets.

**Note**

**Retaining clips hold LSC in place.**

- 5.5 **SECURE** LSC ends with four LSC retaining clips pushed onto LSC bracket legs.

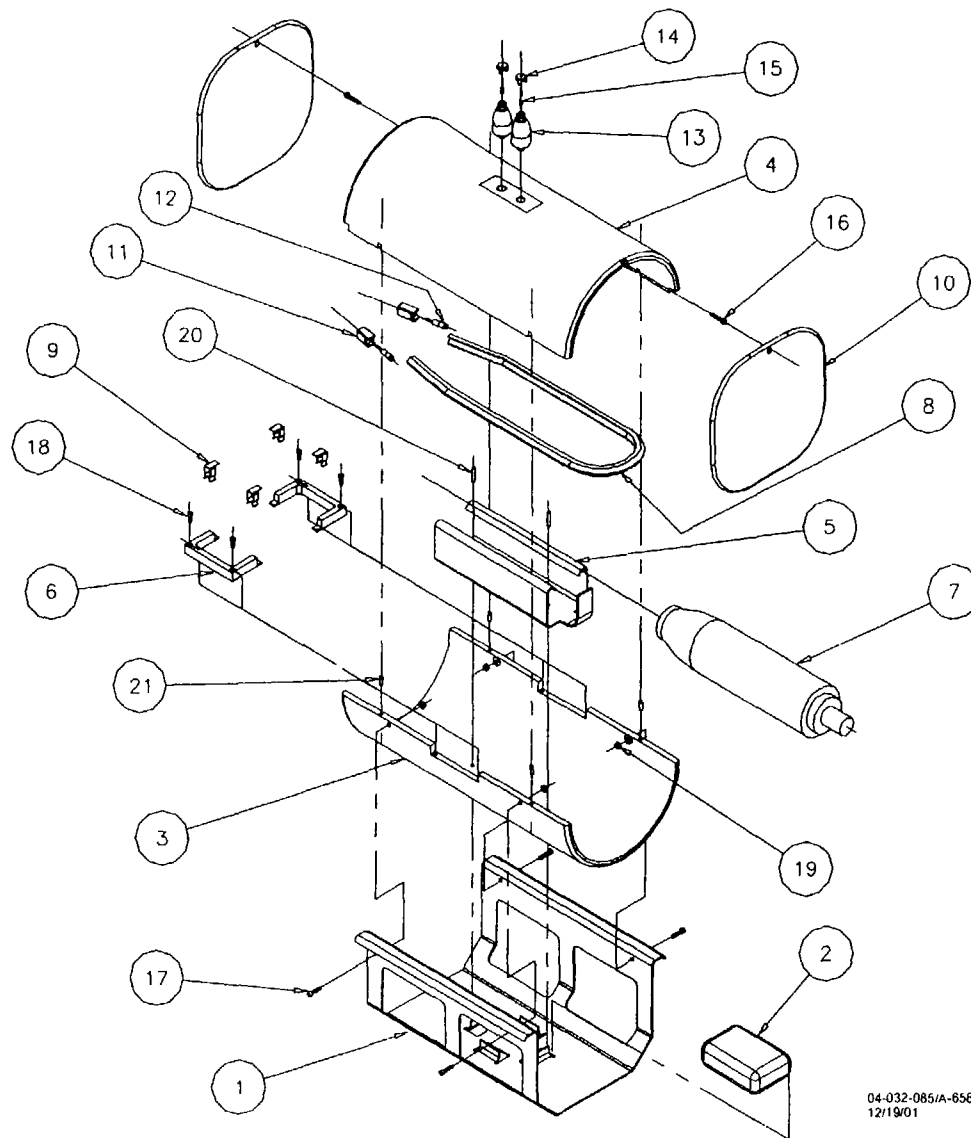
**Note**

**The tip of the detonator must touch the end of the LSC assembly.**

- 5.6 **SECURE** RP-1 detonator to each end of LSC by sliding a detonator clip on each end of LSC.
- 5.7 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in cylinder top.

**CALLOUT:** Obtain photographs.

- 5.8 **LOWER** cylinder top onto cylinder bottom with drilled holes facing toward nose end of munition.
- 5.9 **ASSURE** that two cylinder halves align along entire seam.
- 5.10 **VERIFY** stopper block is positioned directly beneath CSC hole(s). If not, **DO NOT USE** FSS assembly.



- 1 - Frame
- 2 - Stopper Block
- 3 - Cylinder Bottom, 4.2
- 4 - Cylinder Top LI-4.2
- 5 - Munition Holder, 4.2
- 6 - LSC Bracket, 4.2
- 7 - 4.2 Mortar
- 8 - LSC, 4.2 Mortar
- 9 - LSC Retaining Clip
- 10 - End Plate, 12 inch
- 11 - LSC Detonator Clip
- 12 - RP-1 EBW Detonator
- 13 - CSC
- 14 - CSC Detonator Clip
- 15 - RP-2 EBW Detonator
- 16 - .25 x 20 UNC x 1.25 LG SH Cap Screw
- 17 - .25 x 20 UNC x 1.00 LG SH Cap Screw
- 18 - .25 x 20 UNC x 0.625 LG SH Cap Screw
- 19 - .25 x 20 UNC
- 20 - Ø.25 x 1.25 LG Roll Pin
- 21 - Ø.25 x 0.75 LG Roll Pin

Figure E-3. 4.2-inch Mortar Old Style FSS

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### Note

**Whenever two endplates are used on each end of the FSS, the first plate is taped to the FSS and the second plate is suspended on the pin, leaving a gap between the plates.**

- 5.11 **SUSPEND** rear endplate(s) onto assembled FSS. **PLACE** O-ring onto nipple of each CSC, if necessary.
- 5.12 **ATTACH** an RP-2 detonator assembly clip to each CSC.
- 5.13 **PUSH** CSCs into cylinder top until seated firmly against machined surface. **SECURE** with tape as needed.
- 5.14 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
- 5.15 **INSPECT** munition and explosive components for configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.
- 5.16 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.
- 5.17 **COIL** detonator wires, if needed, and **ATTACH** strain relief clips.
- 5.18 **RECORD** time FSS assembly is complete and **PROCEED** to Step 7.0.

**CALLOUT: Announce time FSS assembly is complete.**

- 6.0 **PERFORM** the following steps to load a typical munition into the FSS:
  - 6.1 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK.
  - 6.2 When detonator assemblies are factory-crimped to INTERIOR DETONATOR JACK, **PROCEED** to Step 6.3. If not, **PERFORM** the following:
    - 6.2.1 **REMOVE** RP-1 and RP-2 detonator assemblies from shipping container.

---

### Notes

LSC and CSC detonator leads may remain folded until the connection is made between the interior detonator jack and high voltage feedthrough plugs on the high voltage flange.

Maintain numerical sequence of interior detonator jack detonator cables with numerical sequence of fireset CDU (CH1 through CH4).

6.2.2 **CRIMP** detonator lead wires to detonator cable assembly on INTERIOR DETONATOR JACK.

6.3 **DETERMINE** location of the munition burster using available resources (that is, X-ray, publications, photographs, etc.).

6.4 **PLACE** munition on munition holder so it rests securely in holder with aft end of munition toward rear of CONTAINMENT VESSEL (Figure E-4).

6.5 **ASSURE** munition is stable and will not shift on munition holder. If necessary, **BEND** munition holder tabs or index pin to accommodate proper munition alignment.

6.6 **POSITION** LSC so it extends along the centerline of munition with open ends pointed toward nose and resting in LSC brackets.

6.7 **CHECK** LSC standoff as follows:

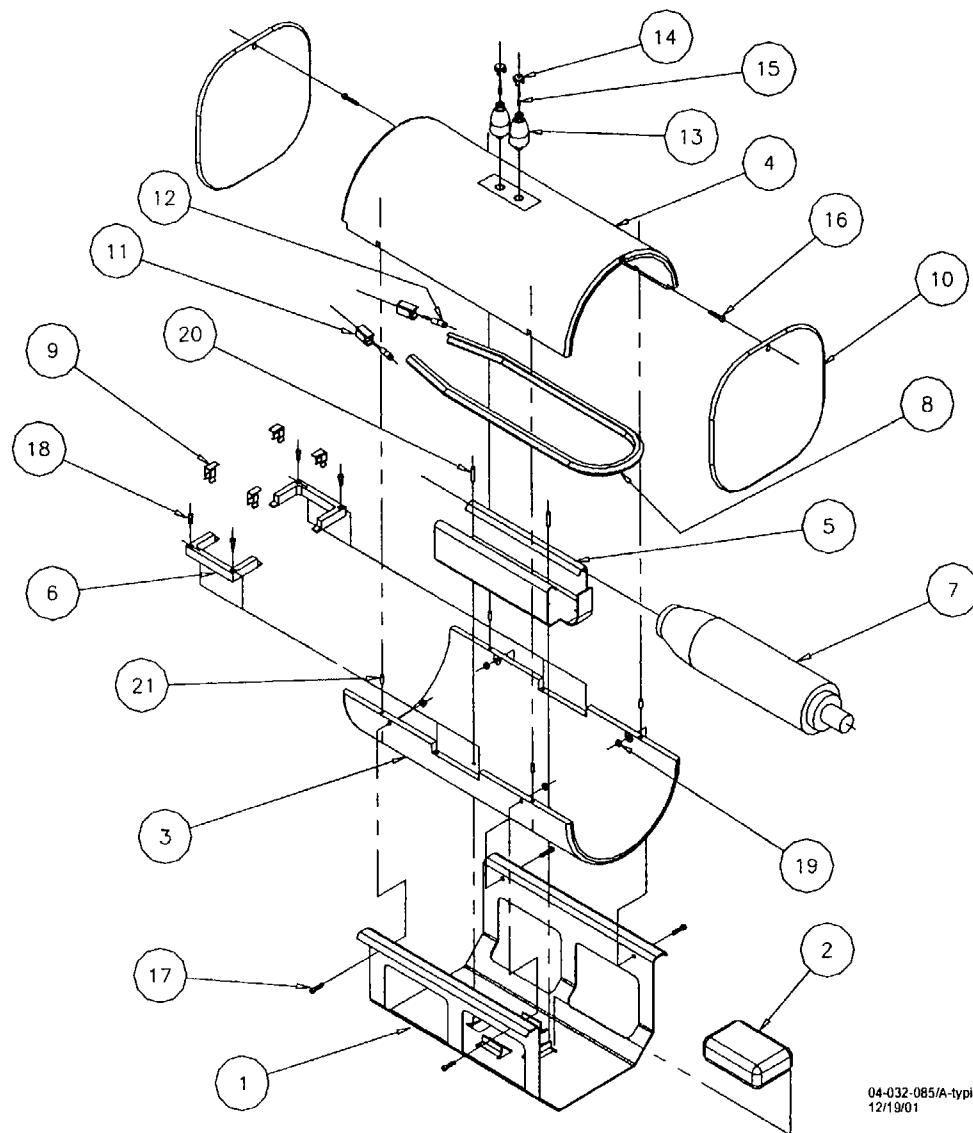
6.7.1 **VERIFY** standoff from LSC to munition is evenly spaced along entire length of munition.

6.7.2 **REMOVE** LSC, if necessary, and **FORM** LSC to fit acceptably.

### Note

The tip of the detonator must touch the end of the LSC assembly.

6.8 **SECURE** RP-1 detonators to each end of LSC by sliding detonator clip on each end of LSC.



- 1 - Frame
- 2 - Stopper Block
- 3 - Cylinder Bottom, 4.2
- 4 - Cylinder Top LI-4.2
- 5 - Munition Holder
- 6 - LSC Bracket
- 7 - Typical Munition
- 8 - LSC, Typical Munition
- 9 - LSC Retaining Clip
- 10 - End Plate, 12 inch
- 11 - LSC Detonator Clip
- 12 - RP-1 EBW Detonator
- 13 - CSC
- 14 - CSC Detonator Clip
- 15 - RP-2 EBW Detonator
- 16 - .25 x 20 UNC x 1.25 LG SH Cap Screw
- 17 - .25 x 20 UNC x 1.00 LG SH Cap Screw
- 18 - .25 x 20 UNC x 0.625 LG SH Cap Screw
- 19 - .25 x 20 UNC
- 20 - Ø.25 x 1.25 LG Roll Pin
- 21 - Ø.25 x 0.75 LG Roll Pin

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Figure E-4. Typical Muniton Old Style FSS



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**Note**

**Retaining clips hold LSC in place.**

- 6.9 **SECURE** LSC ends with four LSC retaining clips pushed onto LSC bracket legs.
- 6.10 **ROUTE** LSC detonator wires out front end of cylinder bottom to align with notch in cylinder top.

**CALLOUT:** Obtain photographs.

- 6.11 **LOWER** cylinder top onto cylinder bottom with CSC holes toward nose end of munition.
- 6.12 **ASSURE** that two half-cylinders align along entire seam.
- 6.13 **VERIFY** that stopper block is positioned directly beneath CSC holes. If it is not, **DO NOT USE** FSS assembly.

**Note**

**Whenever two endplates are used on each end of the FSS, the first plate is taped to the FSS and the second plate is suspended on the pin, leaving a gap between the plates.**

- 6.14 **SUSPEND** rear endplate(s) onto assembled FSS. **PLACE** O-ring onto nipple of each CSC, if necessary.
- 6.15 **ATTACH** RP-2 detonator assembly clip(s) onto each CSC installed.
- 6.16 **PUSH** CSC(s) into hole(s) in cylinder top until seated firmly against machined surface. **SECURE** with tape, as needed.
- 6.17 **ROUTE** four wires from CSCs to lay next to LSC wires outside FSS.
- 6.18 **COIL** detonator wires, if needed, and **ATTACH** strain relief clips.
- 6.19 **INSPECT** munition and explosive components for proper configuration. **ASSURE** RP-1 detonator tips touch LSC ends. **PHOTOGRAPH** prepared munition in FSS, if possible.

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6.20 **VERIFY** all detonator wires remain free from pinching with front endplate temporarily positioned.

6.21 **RECORD** time FSS assembly is complete, and **PROCEED** to Step 7.0.

**CALLOUT:** Announce time FSS assembly is complete.

7.0 **PROCEED** to Procedure 7, Step 8.0 to load FSS into CONTAINMENT VESSEL.

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**ANNEX F**  
**VESSEL TEMPERATURE DISPLAY**  
**IMMEDIATE ACTION PROCEDURE**



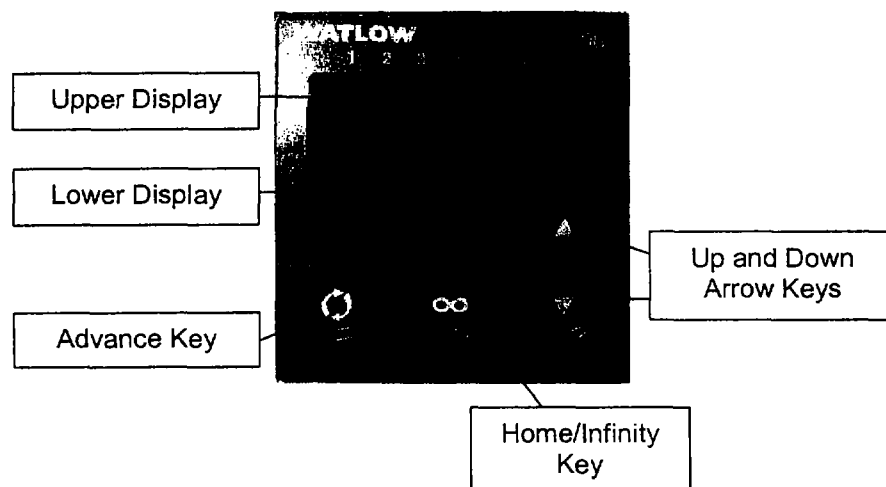
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## ANNEX F

### VESSEL TEMPERATURE DISPLAY IMMEDIATE ACTION PROCEDURE

The purpose of this procedure is to control the vessel heaters in the manual mode and allow the crew to monitor the containment vessel temperature on the Watlow 97 Vessel Temperature Limit Controller on the Utility Panel. This reading is obtained directly from the infrared sensor.

**Tools Required – None.**



Vessel Temperature Watlow 96 Controller

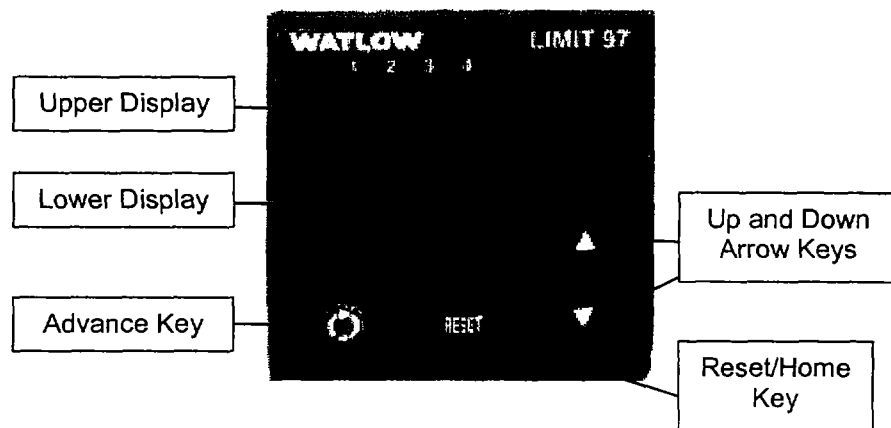
Change settings on Vessel Temperature Watlow 96 Controller in the Vessel Control Panel as follows:

1. On the Watlow 96 Controller push and release the advance key one time. The upper display will read Auto and the lower display will read A-M.
2. Push either Up or Down arrow key once. The upper display will change to read MAn.
3. Push and release the infinity key once. The upper display will return to the perceived temperature reading, which is unknown due to the failure mode encountered. The lower display will now display the percentage of heating. The percentage initially displayed will be between 0.0 and 100.0 and will depend on several factors. The initial reading is not important, as it will be changed to the required setting in the next step.

- 
4. Assure containment vessel is rotating, vessel heater ON button is pushed, and the green light is illuminated.
  5. Push and release the UP and DOWN arrow keys until the lower display reads 70.0.

**Note**

**The vessel heaters are now on at maximum capacity.**



Vessel Temperature Limit Watlow 97 Controller

6. Monitor vessel temperature with infrared sensor by observing the Vessel Temperature Watlow 97 Controller upper display in the utility panel.
7. Turn vessel heaters on and off as required using the heater ON and OFF buttons on the Vessel Control Panel.
8. Proceed to one of the following:

If immediate action steps are successful, return to operating procedure where malfunction first occurred.

If immediate action steps are unsuccessful, replace the Vessel Temperature Watlow 96 controller in accordance with Explosive Destruction System (EDS) Phase 1 Units 2 and 3 (P1U2&3) Operations and Maintenance Manual Procedure SM-ELC-1 (Configure and Set Up the Watlow 96 and 97 Controllers), or replace the radio frequency (RF) box.

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## **ANNEX G ACRONYMS/ABBREVIATIONS**





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## ANNEX G ACRONYMS/ABBREVIATIONS

AC	hydrogen cyanide
AMCR	Army Materiel Command Regulation
amp	ampere
AR	Army Regulation
BA	bromoacetone
CA	bromobenzyl cyanide
CDU	capacitor discharge unit
CFR	Code of Federal Regulations
CG	phosgene
CK	cyanogen chloride
Cl <sub>2</sub>	chlorine gas
CN	chloroacetophenone
CNB	chloroacetophenone in benzene and carbon tetrachloride
CNS	chloroacetophenone and chloropicrin in chloroform
coliwasa	composite liquid waste sampler
CSC	conical-shaped charge
DA	diphenylchloroarsine
DA Pam	Department of the Army Pamphlet
DC	direct current
EDS	Explosive Destruction System
EOD	explosive ordnance disposal
FSS	Fragment Suppression System
ft-lbs	foot-pounds
G, GA, GB	nonpersistent nerve agents
H, HS, HD, HQ, HT	mustards
HASP	Health and Safety Plan
Hg	mercury
HI-POT	high potential
IAW	in accordance with
L	lewisite
LSC	linear-shaped charge
mΩ	milliohms
MARB	Materiel Assessment Review Board
mL	milliliter

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mm	millimeter
MSDS	Material Safety Data Sheet
NC	tin tetrachloride/chloropicrin
O&M	operations and maintenance
P1U2&3	Phase 1 Units 2 and 3
PD	phosgene/phenyldichloroarsine
PDS	Personnel Decontamination Station
PG	chloropicrin/phosgene
PINS	portable isotopic neutron spectroscopy
PMCS	Preventive Maintenance Checks and Services
PPE	personal protective equipment
PS	chloropicrin
psig	pounds per square inch gauge
SOP	Standing Operating Procedure
SSHO	Site Safety and Health Officer
T	dichloroethylthiodiethylether
TM	Technical Manual
TNT	trinitrotoluene
V-F	vacuum flange
VDC	volts direct current
VX	persistent nerve agent

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## **ANNEX H JOB HAZARD ANALYSIS**



## Annex H

### Job Hazard Analysis (Explosive Destruction System Phase 1 Units 2 and 3)

Item	Hazardous Condition	Effect	RAC	Resolution	Controlled RAC	Comment
1	Moving reagent drums that weigh 400-450 lbs. and losing control of drum. <b>Procedure 3, p. 5-3-3, Step 1.6.</b>	Pinching or crushing injury.	(IIC) 2	Use material handling equipment to move containers into position. Wear leather gloves and steel-toed safety shoes.	(IIID) 3	
2	Moving reagent drums that weigh 400-450 lbs. and losing control of drum. <b>Procedure 3, p. 5-3-3, Step 1.6.</b>	Drum damaged and chemical spill with operator injury.	(IIIC) 3	Use material handling equipment to move containers into position. Wear Army Level C personal protective equipment (PPE) per the Health and Safety Plan (HASP).	(IIID) 3	
3	Trailer energized during high potential test of the detonator cables. <b>Procedure 4, p. 5-4-6, Step 7.0.</b>	Personnel injury.	(IIID) 3	Personnel cleared from the trailer area during testing.	(IIIE) 3	Per Sandia National Laboratories, the firing system is not capable of sufficient energy output to seriously harm personnel.
4	Drop heavy parts while setting up loading table and the fragment suppression system. <b>Procedure 5, pp. 5-5-1 to 5-5-3.</b>	Crushing or pinching injury.	(IIIC) 3	Two operators required. Wear steel-toed safety shoes.	(IIID) 3	

Item	Hazardous Condition	Effect	RAC	Resolution	Controlled RAC	Comment
5	Dropping armed munition. <b>Procedure 6.</b>	Explosion with death and significant equipment damage.	(ID) 2	Munition handling by explosive ordnance disposal (EOD)-trained personnel, and nonessential personnel cleared from the area.	(ID) 2	The corrective actions will not reduce the severity or the likelihood of a drop.
6	Drop loading table while moving it from in front of the EDS. <b>Procedure 7, p. 5-7-19, Step 8.12.</b>	Pinching or crushing injury.	(IIIC) 3	Use two operators to move the table, and wear steel-toed safety shoes.	(IIID) 3	
7	Drop blast cover when reinstalling. <b>Procedure 7, p. 5-7-20, Step 9.6.</b>	Pinching or crushing injury.	(IIIC) 3	Use two operators and wear steel-toed safety shoes.	(IIID) 3	
8	Agent-contaminated solid waste contacts unprotected personnel. <b>Procedure 8, p. 5-8-1, Step 1.0.</b>	Possible severe injury from agent exposure.	(IIC) 2	Wear Army Level B PPE.	(IIID) 3	
9	Hydraulic oil pressure of 7,300 pounds per square inch (psi) in hoses. Failure results in release of high kinetic energy. <b>Procedure 9, p. 5-9-1.</b>	Failure of hydraulic hose could result in serious injury.	(IID) 2	Train operators to minimize handling of hydraulic hoses and to keep body parts clear of hoses. Inspect hoses for wear.	(IIE) 3	

Item	Hazardous Condition	Effect	RAC	Resolution	Controlled RAC	Comment
10	Containment vessel door is very heavy and presents potential for pinching or crushing of body parts. <b>Procedure 9, p. 5-9-1.</b>	Serious injury.	(IID) 2	Train operators to be aware of body positions when closing the containment vessel door.	(IIE) 3	
11	Unexpected pressure in containment vessel when opening door. <b>Procedure 9, p. 5-9-12, Step 14.0.</b>	Operator injured by unexpected movement of door.	(IIID) 3	Design of clamps would prevent the door opening, but there would be a release of gas. Army Level B PPE will protect the operator.	(IIIE) 3	
12	Waste gas released in the vicinity of the waste drums when a line before the filter leaks. <b>Procedure 9, p. 5-9-12, Step 14.1.</b>	Operator injury.	(IIID) 3	Clear the area of the waste drums when venting the containment vessel.	(IIIE) 3	
13	Hydraulic nuts fail under pressure. <b>Procedure 9, p. 5-9-13, Step 14.4.</b>	Severe injury or death.	(ID) 2	Position body in front of containment vessel door. Warning is provided in standing operating procedures (SOPs).	(IE) 3	
14	Armed munition explodes when being removed from containment vessel. <b>Procedure 9, p. 5-9-14, Step 14.7.</b>	Severe injury or death.	(1D) 2	Munition handling by EOD-trained personnel, and nonessential personnel cleared from the area.		

Item	Hazardous Condition	Effect	RAC	Resolution	Controlled RAC	Comment
15	Waste gas released in the vicinity of the waste drums when a line before the filter leaks. <b>Procedure 9, p. 5-9-22, Step 15.14.</b>	Operator injury.	(IIID) 3	Clear personnel from the area of the waste drums when venting the containment vessel.	(IIIE) 3	
16	Detonation of munition in the EDS. <b>Procedure 10.</b>	Serious injury or death if anything goes wrong with the operation.	(ID) 2	All personnel must be kept clear of the EDS during this operation.	(IE) 3	
17	Agent release from sample line. <b>Procedure 11, p. 5-11-4, Step 5.0.</b>	Possible operator exposure with minor injury.	(IID) 2	Wear Army Level B PPE. Perform rinse per SOPs.	(IVD) 4	
18	Sharp edges on glass drum thief. <b>Procedure 14, p. 5-14-10, Step 8.9.</b>	Possible puncture wound.	(IIID) 3	Wear leather gloves and break glass thief with a sideways motion against the inside of the waste drum.	(IIIE) 3	
19	Unexpected pressure on containment vessel when opening door. <b>Procedure 17, p. 5-17-1.</b>	Operator injured by unexpected movement of door.	(IIID) 3	Design of clamps would prevent the door opening, but there would be a release of gas. Army Level B PPE will protect the operator.	(IIIE) 3	
20	Hydraulic nuts fail under pressure. <b>Procedure 17, p. 5-17-5, Step 4.0.</b>	Severe injury or death.	(ID) 2	Position body in front of containment vessel door. Warning is provided in SOPs.	(IE) 3	



Item	Hazardous Condition	Effect	RAC	Resolution	Controlled RAC	Comment
21	Cut gloves on debris from detonation when cleaning out containment vessel. <b>Procedure 18, p. 5-18-1, Step 1.0.</b>	Minor cut injury with possible contamination with toxic material.	(IIID) 3	Wear leather gloves over rubber gloves.	(IIID) 3	
22	Full or partially full drum dropped when it is being removed from secondary containment. <b>Procedure 19, p. 5-19-8, Step 21.0.</b>	Crushing or pinching injury.	(IID) 2	Use mechanical handling equipment to move drum.	(IIIE) 3	
23	Chemical drips from transfer line while removing dip leg from bulk drum. <b>Procedure 20, pp. 5-20-1 to 5-20-4, Steps 1.0 and 2.0.</b>	Operator exposed to chemical with possible minor injury.	(IIIC) 3	Wear Army Level C PPE per HASP.	(IIID) 3	
24	Exposed to agent during decontamination of the EDS. <b>Procedure 21.</b>	Agent exposure with serious injury.	(IID) 2	Wear Army Level B PPE until equipment is monitored and proven to be 3X.	(IIE) 3	
25	Mishandling of needle when venting sample bottle. <b>Annex C, p. C-1, Step 6.</b>	Puncture wound.	(IIID) 3	Exercise caution when handling needle.	(IIID) 3	

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## **ANNEX I REFERENCES**



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Army Materiel Command Regulation (AMCR) 700-107 with Change 1, *Preparation of SOP for Ammunition Operations*, 16 November 1992.

Army Regulation (AR) 385-61, *The Army Toxic Chemical Agent Safety Program*, 12 October 2001.

AR 385-64, *U.S. Army Explosives Safety Program*, 1 February 2000.

Department of the Army Pamphlet (DA Pam) 40-8, *Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents, GA, GB, GD and VX*, 4 December 1990.

DA Pam 40-173, *Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, HT and L*, 30 August 1991.

DA Pam 50-6, *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*, 17 May 1991.

DA Pam 385-61, *Toxic Chemical Agent Safety Standards*, 27 March 2002.

DA Pam 385-64, *Ammunition and Explosive Safety Standards*, 15 December 1999.

Edgewood Research, Development & Engineering Center, *Preparation of Standing Operating Procedures*, ERDEC-SP-058, Aberdeen Proving Ground, Maryland, January 1998.

EM 385-1-1, *Safety – Safety and Health Requirements*, U.S. Army Corps of Engineers, 3 September 1996.

National Institute for Occupational Safety and Health/Occupational Safety and Health Administration/U.S. Coast Guard/Environmental Protection Agency, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985.

Product Manager for Non-Stockpile Chemical Materiel, *Operations and Maintenance Manual for Explosive Destruction System Phase 1 Units 2 and 3*, Draft, July 2002.

Program Manager for Chemical Demilitarization, *Health and Safety Plan for the Explosive Destruction System Phase 1 Unit 2 Developmental and Operational Testing at Aberdeen Proving Ground-Edgewood Area, Maryland*, Revision 0, Change 1, April 2002.

Sandia National Laboratories, *One-Pound Explosive Destruction System System Hazard Analysis*, (M1-02/03), Final, 21 November 2001.

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Technical Manual (TM) 60A-1-1-11, *Chemical/Biological (C/B) Agent and Related Materials; Characteristics, Leak Sealing, Disposal and Decontamination*, 25 June 2000.

TM 60A-1-1-22, *General EOD Safety Precautions*, 6 May 1998.